

2003 Exam Markers Report



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This document contains the report on the 2003 Membership and Graduateship examinations by the Chairman of the Examinations Committee, William C. Cox who has been assisted in this task by Mark Fisher, who compiled the individual examiners' reports

The numbers of candidates taking the examinations in total has fallen once more although in individual papers and some levels of examination an encouraging increase has been noticed. It is worth making the point that there are no plans at the present time to discontinue this system of examinations. For many non-UK IFE members this represents the only method of satisfying the academic requirements of membership.

This is the first year of the new examination structure and the revised method of moderation for those candidates taking more than one paper and it is disappointing to see so few candidates taking advantage of the new regulations for multiple papers. In fact this is the first year ever that the Godiva prize for the best UK student at Member level has not been awarded. For the first time there was no UK candidate passing all four papers at the one sitting.

As has been reported many times in the past the most common reason for students failing to satisfy the

requirements of the examinations do so because of a lack of study. Many however also fail to provide sufficient detail in their answers to show that they understand the topic being involved. A few lines or even half a page is not usually sufficient to be able to demonstrate any depth of understanding especially at Member level.

However it is always encouraging to see a number of very good scripts that are submitted.

My thanks must go to the markers, the question setters, IFE staff at HQ and all of those members who give their time and energy to making the whole process possible and without whom the system would be impossible.

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REPORT ON IFE EXAMINATIONS 2003 Membership Examinations

Paper 1 - Fire Engineering Science

Question 1.1: a) Describe the Venturi effect and explain how it is utilised in the design of a “branch”. b) The difference in pressure between the inlet and outlet of a branch is measured as 10 metres of water. If the inlet is 90 millimetres diameter and the outlet 25 millimetres diameter, calculate the velocity at the outlet.

Approximately half of the candidates fared poorly in this question. Those candidates that were not side tracked into descriptions of foam making branches eg 5x or equivalent, and calculated the areas of both ends of the branch using the equation $A_1V_1=A_2V_2$ and then, using Bernoulli's theorem, derived the velocity at the outlet, scored well. Some candidates were unsure of what formulae to use and remained uncertain regarding hydraulic calculations involving flow and pressure and lost marks. It is worth remembering that even if you arrive at the wrong answer you could still obtain marks for showing formulas used and all workings. Better still, if at all possible, if unsure regarding this type of question, stay well clear.

Question 1.2. a) Describe a flame or combustion in terms of chemical reactions; and b) Discuss the factors, which influence the speed of the reaction.

This was a popular question with many candidates failing to achieve sufficient marks to obtain a pass. The one most common area of lost marks was by candidates describing the physical qualities of combustion/flame, rather than combustion in terms of chemical reactions. However, other candidates redeemed themselves with the production of excellent illustrations of

branching chain reactions. All students should take enough time to carefully read and understand the question before attempting to answer.

Question 1.3: Discuss the factors which influence the severity of a fire within a room or building.

With the exception of two candidates, who achieved full marks, the other candidates who attempting the question demonstrated through their respective low marks that they did not have sufficient information to attempt this question. Quite a few offered scripts discussed intervention to the development, which was clearly not asked for. The answer was subject to three main factors, fuel, air supply and loss of/retention of heat, and inclusion of these three factors would have improved candidates chances of attaining a pass mark, dependent of course on the information given and its relevance.

Question 1.4: The physical properties of a solid combustible material can influence its response to external heating and its contribution to fire growth. a) State the three properties that are combined to define “thermal inertia”; b) Explain how thermal inertia can influence the behaviour of solid combustibles during the ignition stage of a fire; c) Give one example of a solid combustible that exhibits relatively low thermal inertia and another form of a similar material that exhibits high thermal inertia and contrast their relative behaviour in fire.

This was a very unpopular question for both home and overseas candidates; and all candidates who did attempt to answer failed to achieve half the marks that were available. Candidates need to strengthen their knowledge regarding thermal inertia. Thermal

inertia determines how quickly the temperature of a material will rise when exposed to a course of heat. In terms of a formulae thermal inertia can be expressed as KPc , where: Thermal conductivity = (K); Density = (P), and Specific heat capacity = (c)

Question 1.5: a) Explain the meaning of the term “detector”; b) Describe briefly the different types of fire detector, which fall within the definition.

Some excellent scripts were submitted for this question with the remaining candidates generally achieving more than 50% of the marks available. The main area where points were lost and just as importantly time was lost during the examination was when candidates offered information on the advantages/disadvantages between different types of detectors. This was not asked for and no marks were awarded. Otherwise, a well answered question.

Question 1.6: Detail protective arrangements for the use of electricity in atmospheres that are flammable or contain explosive dusts.

This question tends to pop up with some regularity at membership level, and therefore I am surprised with the poor level of knowledge held at this level regarding the protective arrangements for the use of electricity equipment in either flammable or explosive atmospheres. For some reason overseas candidates achieved the highest scores with home candidates failing to mention and discuss such issues as the definition of flammable atmospheres, flameproof equipment, pressurised equipment etc. Candidates are therefore reminded to adequately prepare themselves for this subject matter prior to attempting this type of examination again.

Question 1.7: Describe the processes involved when cold air mixes with hot smoke rising from a burning item in a compartment fire and describe how this process is influenced by: a) Compartment ceiling height; b) The difference between a fire located in the centre of a room, against a wall and in a corner on the time to flashover

This question was divided into three equally scored sections. Overseas candidates generally answered this question in a logical sequence and scored well. Home candidates had trouble expressing themselves and were clearly unfamiliar with the principles of compartment fires. One of the most important pieces of information that was generally overlooked which cost candidates dearly, was that in section B, a fire that was in a corner and against the wall would have a reduced time to flashover compared to a similar size fire in the middle of the same compartment. A greater understanding of this subject is therefore required, especially amongst home candidates.

Question 1.8: Describe the uses, hazards and storage of Hydrochloric acid.

Few candidates chose this question. This was also reflected in the low scores achieved, which highlights the poor level of knowledge of this subject held at Membership level. Candidates often lost marks by detailing the level of chemical protection that would satisfy taking action at incidents involving Hydrochloric Acid. This was not requested and attained no marks. If you are unsure of the model answer, approach the answer in a methodical manner, this may pre-empt issues that would otherwise remain dormant in the back of your mind, but there is no substitute to thorough preparation.

Paper 2 - Fire Safety

Question 2.1: It is a general principle that public buildings should be accessible to all members of the community. Discuss the range of provisions that might be included in a building to ensure that people with impaired sight or impaired hearing could evacuate a building safely in the event of fire.

Candidates demonstrated an awareness, but generally failed to produce sufficient detail regarding the provision for the deaf and those members of the community who were partially sighted, to have attained excellent scores. Instead their answers were directed towards more general issues associated with overall disability requirements. Candidates are therefore reminded to confine their answers to those issues required by the question.

Question 2.2: Discuss the requirements necessary for sufficient access to enable firefighters and fire appliances to be brought near to a multi-storey commercial complex including a basement, for effective use.

This was a popular question, and although a good percentage of candidates achieved a pass mark, their scores could have improved if they had read and understood what was being asked by the question. Many candidates were conversant with issues such as vehicular access, provisions of rising mains and firefighting mains, but failed to mention the requirements associated with commercial complexes containing a basement.

Question 2.3: Discuss the requirements for an effective evacuation procedure for a large nursing home providing care for elderly people of mixed physical ability. Your answer should include reference to the way in which the provision of a modern fire alarm and structural fire resistance would influence such a procedure.

This bread and butter type question offers the candidate an excellent opportunity to demonstrate their knowledge of this subject. On the whole that was achieved and some candidates achieved excellent scores. Some candidates however produced lengthy scripts but failed altogether to mention fire alarms or structural fire resistance, therefore losing many of the available marks. At Membership level it is expected that candidates understand the difference between producing a list answer as opposed to providing a discussion. At this level it is generally the latter and therefore candidates should be vigilant whilst reading the question.

Question 2.4: Engineering services in buildings can present considerable fire related problems. Discuss in detail the measures to reduce such problems.

The question asked specifically for the measures that can reduce the problems associated with engineering solutions. Why was it then that some of the candidates who failed this question described issues around fire engineered solutions? Some excellent scripts, however, were produced and their answers demonstrated these candidates had adequately prepared themselves for this subject. Well done.

Question 2.5: Discuss in detail the principle of fire safety legislation in your own country; in particular, discuss the balance of responsibility between employers and the enforcement agencies. You must refer in your answer to both the law relating to newly constructed buildings and the maintenance of fire safety in occupied buildings.

At first sight this question could have appeared quite daunting, but for the candidates who attempted it, especially the overseas candidates, generally excellent marks were achieved. One area where possible further revision could focus was the detailing behind the principles of the fire legislation in the candidates country. This information was seldom included in answers.

Question 2.6: Discuss the range of structural fire protection measures that you would expect to be incorporated into a modern city complex that housed commercial, assembly, and residential accommodation.

Time after time this type of question is rolled out at this examination and this year, as before, candidates failed to approach the answer in a logical sequence, mentioning such matters as compartmentation, structural fire protection, materials

of construction etc. Instead some candidates produced answers based on general fire precautions. Candidates must therefore fully read and understand the question and produce a structured answer. Adoption of this approach may pre-empt points that otherwise may have been forgotten.

Question 2.7: (a) Outline the Montreal Protocol for the phasing out of halon based fire protection systems; and (b) Discuss the considerations, which should be used for assessing the suitability of a replacement system.

This question was favoured by the overseas candidates. They had grasped the principles behind the Montreal Protocol and generally demonstrated better discussion associated with the second part of the question. One point that I will make reference to was the lack of candidates who knew that the manufacture of Halon based products had now ceased.

Question 2.8: a) Discuss the importance of selecting and correctly installing the appropriate sprinkler head for a sprinkler installation; and b) Discuss the factors that could adversely affect the performance if not correctly installed.

This understandably was a very popular question but although there was an understanding of the subject at Membership level an in-depth knowledge of the subject was required but seldom demonstrated. Candidates occasionally lost marks by detailing the whole of the sprinkler system, but possibly with the time constraints of the examination failed to give the specific detail associated and required about the sprinkler head. Candidates therefore should not deviate from the requirements of the question, remain focused and produce detailed answers that would earn them valuable marks to an overall pass.

Paper 4 - Building Construction

Question 4.1: Discuss the issues surrounding sprinkler/smoke and heat ventilation technologies when used together.

Candidates generally displayed a fair level of knowledge regarding both sprinkler and ventilation systems, but did not fair so well when considering the technology of using both systems in tandem. Some candidates were clearly guessing and reluctantly no marks could be awarded. Marks were awarded for outlining the principles of each system, however to achieve a pass mark mention would also have to be made of the cooling and stirring effects, enhanced burning rates by fresh air being introduced and delayed sprinkler activation. Additional preparation for this subject matter is required by all candidates prior to any future attempts on this subject at Membership level.

Question 4.2: Intumescent coatings can be applied to structural steel during manufacture or in-situ (on-site). Discuss and compare.

This question bears testament to recent interest in Intumescent coatings as a vehicle to satisfy Fire Safety requirements. Candidates generally provide excellent scripts but fail to achieve any marks for including descriptions of how Intumescent material behaved in fire, as this was not requested in the question. Marks were available if candidates had included information on the following issues: quality control, health and safety, application standards and cost/confined space working.

Question 4.3: Outline the requirements for designing smoke and heat exhaust ventilation systems. (SHEVS).

Once again this was a popular question with some excellent submitted scripts. Marks were occasionally lost by candidates that gave detailed accounts of natural ventilation methods, candidates should have read the question and focused their answers on what was required. If this was undertaken answers would have included such issues as 'visibility levels, standards

of equipment installation, and an acknowledgement of the type and size of buildings that (SHEVS) are best suited for'.

Question 4.4: Highlight the consequences and detail the fire safety design features that can be used to reduce the impact of a school fire on a community.

This question was generally well answered, however there were a few candidates who failed to appreciate the dramatic effect that a serious fire in a school has on the community. Lateral thinkers would have adopted a logical approach to answering this question and with the benefit of personal experience would have included such items as loss of pupil work, disruption and long term loss of facility, as well as other issues such as cost of rebuild etc. With regard to fire precautions it should be considered at the premises, candidates could have included such measures as compartmentation, sprinkler systems, CCTV etc. This was an interesting question which should have been relatively easy to attain a good pass mark.

Question 4.5: What are the criteria for determining whether a dry or wet rising main should be installed in a multi-storey office block?

This should have been viewed as a bread and butter question at Membership level. Thankfully the marks awarded bears testimony to the fact, with only the occasional mistake when mentioning the benchmark heights for the installation of each system.

Question 4.6: Discuss the demands that are placed on building techniques and their relationship to fire safety for very tall buildings in excess of 200 metres high.

This was not a popular question as could have been expected after the events in New York in 2001. Those candidates that did attempt the question lost the opportunity to score well by focussing their attentions on basic fire precautions. Very few took account of access and search and rescue arrangements in the event of terrorism or natural disasters. Those candidates that scored the highest marks made particular reference to innovative design, consideration of structural collapse and preservation of the building. This is a high level examination and the standard of answers should reflect this.

Question 4.7: More and more multi-storey office buildings are of curtain walled design. (a) Define the term 'curtain wall', and (b) Discuss the fire risks associated with this design and how the risks can be eliminated.

Surprisingly this was an unpopular question for this common construction method. Marks were readily available if candidates had mentioned points such as non-load bearing, imposed loads and wind bearing loads transferred to structure by fixings and need for fire resistance. It is a compact subject that could quite easily have been awarded discretion marks for the inclusion of well labelled diagrams. Generally a missed opportunity!

Question 4.8: Describe in detail how fire loading is calculated.

This question has been used time and again at Membership level, therefore there are no reasons why only 50% of candidates achieved a pass mark. Those candidates that fared well did so by concentrating on the basics and providing detailed responses as requested by the question. Expressions such as 'wood equivalent' and 'heat energy value' demonstrated that the candidate had a good understanding of this issue. For those candidates that failed to achieve a pass mark with this question they are reminded to revise this subject prior to an attempt at a similar question/examination.

Paper 5 - Human Resource Management

Question 5.1: a) Discuss the advantages and disadvantages of interviews; and b) Suggest alternative selection procedures.

This was a popular question with a disappointing level of passes being awarded. The majority of candidates lost marks within Part 1 of the question. Candidates became bogged down with detailing the interim procedure and techniques, rather than discussing the advantages and disadvantages of interviews. Marks were often gained with quite detailed discussion regarding alternative selection processes.

Question 5.2: a) Discuss planning as a key concept in organisational development; and b) Describe how the inclusion of performance review affects this concept.

The majority of candidates who chose this question answered it either satisfactorily or achieved excellent scores. Marks were occasionally lost by candidates failed to link their answers to organisational development or by failing to appreciate the role of performance review. The broad thrust of the question was why do organisations need to develop, how planning is used to implement the necessary changes and the importance of mentioning and reviewing plans to ensure that they are being met or if they need to be amended. Candidates should carefully read the question and highlight keywords/phrases around which to structure their answer.

Question 5.3: There are five common forms of organisational structure. Describe each in detail.

Surprisingly for a question with such a definitive model answer this was very unpopular with only a handful of candidates achieving excellent scores. Candidates lost marks through not understanding the question's requirements or not having read about the different organisational structures in the associated bibliography, 'Supervisory Management by P W Betts'. Excellent scores were awarded to candidates that identified the following five types of structure: 1) Functional; 2) Geographical; 3) Product; 4) Divisional; 5) Matrix. These answers described how they operate and the advantages/disadvantages of each style. Other structures which were accepted as part of the answer were owner/manager structures often found in small and medium sized firms and cluster structures found amongst professional groups eg Doctors and Solicitors

Question 5.4: Health and Safety concerns everyone in an establishment. Discuss: a) the roles of management, medical advisors and safety advisors; and b) areas of potential conflict.

Overall, the level of response was high. Health and Safety policy is now an integral part of the managers role in today's world, this was reflected in the quality of responses achieved. Some excellent scripts were submitted and those candidates clearly held a detailed knowledge of the subject and offered discussion on the four key areas of: 1) The role of management; 2) The role of medical advisor; 3) The role of the safety advisor, and 4) Areas of potential conflict

Question 5.5: a) Explain the concept of Quality Control; b) What factors would you take into account in developing a quality control system?

Of the 45 candidates who attempted this question, 37 achieved satisfactory answers and even the poor answers exhibited some knowledge. Candidates lost marks through providing insufficient detail, successful answers described the concept of equality control and the range of factors which have to be taken into account before attempting to develop a system. The question required candidates to identify that Quality Control is related to meeting standards relating to customer requirements and a wide range of explanations were accepted ie: Basic quality control, statistical process control, total quality control, quality assurance and total quality management. Factors to be taken into account in developing a Quality Control System needed to include Management Commitment, need to involve employees, costs involved, type of product or service, need for training and performance review systems. Candidates are reminded to thoroughly understand the questions requirements prior to answering questions.

Question 5.6: a) Discuss the benefits of good teamwork; and b) Describe how you would develop an effective team.

A very popular question with a high percentage of candidates achieving a pass. Detailing the key aspects of good teamwork, and building an effective team was what was required and candidates who went through both sections listing issues as bullet points with detailed discussion underneath, scored well. The quality of answers made this question a pleasure to mark.

Question 5.7: a) Discuss the importance of staff development in organisations; and b) Identify the skills you would use in developing an employee or group of employees.

Considering the importance of developing staff, few people answered the question to a high standard. Many candidates focussed on the importance of training rather than the strategic package relating to a Human Resources plan. Good marks were gained for stating the importance of producing Human Resources plans linked into business plans, a good percentage of individuals highlighted the importance of staff development both at local level and nationally. Candidates should always take the opportunity to read the question and understand its content before preparing an answer. Though this question required individuals to comment on the importance of training, it was not the key thrust of the answer.

Question 5.8: As a senior manager, you have been asked to organise a meeting to develop a strategic plan for your organisation. What factors would you take into account to make the meeting productive?

Of the 41 candidates who attempted this question, just over 50% achieved a satisfactory score to achieve a pass and 6 candidates achieved excellent scores. Some candidates lost marks by failing to link the organisation of a meeting with the need to develop a strategic plan. The question required candidates to identify the purpose of a strategic plan and then describe the factors to be taken into account in organising a meeting to achieve one. These being, the right people attending, provision of information, effective chair person, minutes to identify action required, logistics of the meeting agenda, produced timing, location and equipment. Candidates need to read the question carefully and structure their answers accordingly.

Paper 6 – Fire Service Operations

Question 6.1: Discuss 'Post-incident' debriefs as an important element in ensuring effective operational performance.

Although this question attracted few attempts the scores achieved were of a very high standard. This reflected a good understanding of this important process. Too much time was wasted repeating information and explaining the structures of debriefs rather than their contents. Candidates scored well by focussing on the principle purpose of the debriefing process and submitting examples such as: 1) Opportunity to validate good practices and procedures; 2) Opportunity to observe limitations of equipment; 3) Provides support/encouragement for individuals and team welfare as key issues to support the benefits of post incident debriefs

Question 6.2: Discuss factors to be considered prior to introducing a new item of equipment into a fire brigade.

Candidates were ill prepared for this question. Those that did attempt to answer failed to achieve a pass mark. The five areas of concern to be considered are: 1) Consideration of intended purpose of the equipment; 2) Assessment of the functionality of the equipment; 3) Assessment of Health and Safety considerations; 4) Assessment of training requirements; 5) Consideration of financial implications. These can be considered key to the implementation of many fire engineers disciplines.

This is a very popular question at Membership level and prospective future candidates are recommended to study this subject as part of their preparation.

Question 6.3: Discuss the factors to be considered in determining operational firefighting tactics at an incident within a railway tunnel.

This was a relatively well answered question with candidates demonstrating a broad understanding of the important factors to be considered at this type of incident. Candidates did however occasionally lose marks by not elaborating on their list answers, and almost all candidates failed to mention the advantages associated with undertaking a risk analysis/assessment of the incident. At Membership level there is an expectation that candidates should be able to demonstrate more readily the ability to clarify the main points of an answer and then as necessary provide specific examples to support this.

Question 6.4: With particular reference to fireground operations, discuss reasons for adopting trunked main radio systems rather than non-trunked alternatives.

Only overseas candidates attempted this question and their answers demonstrated a reasonable level of knowledge associated with this subject. The majority of candidates scored well by explaining the advantages of trunk systems, but then disappointingly lost valuable marks by failing to discuss the comparisons with non trunked systems. Candidates are recommended to adequately prepare themselves for future questions relating to this subject and have sufficient knowledge to produce a balanced discussion on the advantages/disadvantages of trunked main radio systems.

Question 6.5: Outline the main planning stages associated with pre-planning for fires and other emergencies. Illustrate your answer by use of an appropriate example.

This was a reasonably answered question but at Membership level it was expected that candidates would read and understand the requirements of the question before producing an answer focused on the strategic perspective. Eight marks were available for submissions of an appropriate example for the following five stages: 1) Assessment; 2) Prevention; 3) Preparedness; 4) Response; 5) Recovery. These 8 marks were unfortunately not always awarded and for candidates this could have been the difference between pass and failure.

Question 6.6: Discuss the equipment requirements for the provision of a rescue capability for incidents in or on inland water courses.

The majority of candidates who attempted this question pleasingly achieved high marks. This demonstrated an in-depth knowledge of issues associated with incidents on inland water courses. Candidates scored well by the inclusion in their answers of the following points: 1) Equipment considerations; 2) Risk assessment process; 3) Appreciation of provision of equipment

Question 6.7: Discuss the specific factors to be considered when dealing with fires in insulated ships in ports with regard to the following: (a) Pre-attack information; (b) Where the fire is in the hold; (c) Where the fire is in the insulation/ducting

Nearly every year there is a question relating to ships in this paper. Therefore it was disappointing that so many candidates failed to score well attempting this question. There appeared to be a general misunderstanding of the specific issues relating to fires in insulated ships. All too often candidates approached the answer from a general ship firefighting viewpoint, at Membership level this was not adequate to achieve a pass mark. Candidates are reminded not to rely on general knowledge but rather study the associated bibliography.

Question 6.8: Discuss the factors to be considered with respect to the provision of communications at an incident.

This subject appealed more to the home candidates than overseas. That aside, there is no explanation why the highest mark awarded was only that of 7, clearly candidates did not understand the practical and technical issues associated with the provision of 'at incident communications'. Candidates failed to realise the importance of considering the following three main areas: 1) Health and Safety; 2) Functional requirements; 3) Operational issues. A more strategic approach is required at Membership level and, therefore, these candidates and other prospective candidates are reminded to improve their knowledge of this subject.

Paper 7 - Aero Fire Studies

Question 7.1: Discuss how an airport is categorised in relation to the provision of rescue and firefighting facilities.

If candidates had adequately prepared for this question and then read and understood what was required, they would not have lost marks by submitting scripts that were supportive of the requirements. An example of this was the general mistake of candidates focusing on rescue and firefighting requirements, media and appliances. Many candidates also failed to produce the appropriate table. This had a maximum allowance of 5 marks, all lost, which for many could have provided an upgrade to a pass mark. On a more positive note, there were those candidates who were aware of the 700 movement criteria and achieved easy marks towards their overall passes.

Question 7.2: Discuss post accident discipline with regard to: (a) Movement of wreckage; (b) the need to preserve evidence at the site of an aircraft accident; (c) dealing with bodies and personal effects

This was by far the most popular question and therefore it was disappointing that so many candidates lost marks by the submission of scripts that failed to contain adequate detail to award a pass mark. This is the Membership examination and answers must reflect this standard. Candidates repeated themselves throughout the three parts. There were a minority of candidates who had obviously grasped a thorough understanding of this subject and these answers covered such issues as flight recorders, photographs, maps, videos etc.

Question 7.3: Aircraft hangars used for the storage, maintenance or housing of aircraft can be classified into three main groups. a) Detail the criteria for each group; and b) Outline the means of escape requirements.

Candidates demonstrated a limited knowledge of this subject with only a few candidates achieving a pass mark. The model answer is quite definitive and I find it surprising that more candidates failed to see this as potential question material. Candidates are therefore recommended to remind themselves of this subject by reading the associated bibliography.

Question 7.4: Discuss the factors to be considered when ventilating an aircraft cabin whilst firefighting aboard passenger aircraft.

A very popular question with candidates failing to provide adequate detail in their answers to award sufficient marks for a pass. Marks were commonly lost by failing to mention:- large quantities of dense, toxic smoke, ventilation by opening doors, windows on both sides of the aircraft. At Membership level candidates would fair better if they adopted a logical approach to answering this type of question, moving from one end of the aircraft to the other, thinking through different issues on route and finishing with a strategic overview. That aside, there is also no substitute for an adequate study regime.

Question 7.5: Discuss the relevance of emergency exercises; and the guidance for pre-planned rendezvous points and staging areas, in ensuring the efficiency and effectiveness of airport fire and rescue operations.

This was a popular question with candidates, but enthusiasm was not reflected in their answers. Candidates generally failed to provide adequate detail to achieve the marks available to obtain a pass mark. Candidates lost marks by not clearly understanding the purpose of emergency exercises and further did not appreciate the importance of carrying out these exercises utilising aircraft that would normally be expected to use the airport in question. Some candidates appeared confused by the requirements of the question and are reminded to read the question thoroughly prior to attempting an answer.

Question 7.6: Describe the function of the International Civil Aviation Organisation and how it affects civil aviation in your country.

Clearly the most unpopular question in this year's paper. Questions focused around the International Civil Aviation Organisation are common place at Membership level, and adequate revision on this subject is obviously recommended. I will not offer any further comments other than to say that it would indeed be prudent for candidates to review their submitted answer against the model answer found on IFE monograph, pages 94/95.

Question 7.7: In relation to aircraft fires describe: (a) the concept of critical area; (b) how the critical area is used to calculate the amount of water required for control of a fire; (c) Other factors which affect the quantity of water needed to extinguish a fire

Candidates demonstrated a comprehensive knowledge for the concept of 'critical areas' and generally scored well by producing answers that were set out in a logical manner. The formulae was presented and used correctly with given examples and candidates scored well. Examples of theoretical and practical critical areas were mentioned as well as the variables that affect the quantity of water required and again candidates achieved good marks here. It was pleasing to read these scripts and demonstrated the professionalism of existing fire engineers towards this type of incident.

Question 7.8: Discuss in detail the rescue of aircrew from military aircraft.

Many candidates took full advantage of gaining easy marks from this bread and butter question. Questions relating to the rescue of personnel from military aircraft are common place and appear in a number of environments and examinations. Candidates did however fail to scoop up the marks available for commenting on issues such as: 1) Four distinct stages of rescue; 2) Ejector Seats; 3) Miniature detonating cord. Candidates laid out their answers in a logical sequence, they demonstrated their ability with this subject and consequently achieved excellent marks.

Paper 8 - Fire Investigation

Question 8.1: Explain briefly the following glossary of terms: (i) Alligating; (ii) Annealing; (iii) Autoignition; (iv) Backdraft (The British Spelling of this American term is Backdraught); (v) Combustion; (vi) Flame; (vii) Pyrophoric; (viii) Spontaneous ignition; (ix) Vapour Density; (x) Plume

Generally this was a well answered question with candidates demonstrating they had grasped this subject sufficiently to achieve, in some cases, excellent scores. The only definitions that appeared to pose problems were those of: 1) Pyrolysis:- Capable of oxidising on exposure to atmospheric oxygen at normal temperatures; 2) Annealing:- Loss of temper in metal caused by heating.

Question 8.2: Gas Chromatography is used in the laboratory for identification and screening of volatile samples. With the aid of a diagram(s) illustrate how this technique is undertaken.

This was a very technically based question only attempted by 7 candidates. Their answers were generally very good which demonstrated at Membership level an excellent comprehension of Gas Chromatography. Points were achieved with the inclusion of accurate diagrams that supplement descriptions of the equipment and the process involved. Candidates, through their method of producing an answer without considering a logical sequence that may have highlighted key issues and pre-empted information, lost marks. Candidates especially at Membership level should be familiar and well tested at looking at strategic issues and adopting methodical approaches to answering questions.

Question 8.3: Discuss the use of fire scene sketches as a supplement to photographs and written notes.

A very popular question with many candidates achieving an easy pass mark. The question was specific and asked candidates to discuss why sketches are used as a supplement to photographs and written notes. Marks were generally achieved by well executed sketches of a sketch which clearly demonstrated the value that could be attached to this method of evidence gathering. Candidates did miss the opportunity to achieve other available marks by failing to mention that any sketch drawn would form part of the available contemporaneous evidence and should, therefore, contain the following information: 1) Investigators name, rank and agency; 2) Full name of others assisting in preparation; 3) Date and time prepared; 4) Case or incident number; 5) Address of location; 6) Geographical orientation; 7) Legend of meaning of symbols; 8) Scale of drawing

Question 8.4: Prepare guidance notes to assist the fire investigator in identifying incendiary fires.

Interestingly nearly all candidates who attempted this question misread the question and directed their efforts towards incendiary devices and not incendiary fires and therefore there was some very interesting but totally irrelevant information submitted. For those candidates who did attempt the right question, some failed to achieve some easy marks by preparing guidance notes. Instead they produced list answers without any supporting statements. Clearly this was the classic case of not reading and understanding the question.

Question 8.5: Arsonists, especially amateurs, often use flammable liquid accelerants to supplement their work. Explain the effects that this might have on a fire scene.

This question was generally poorly answered with some candidates misreading the question and providing answers regarding the signs of arson, rather than what was being asked for, that being the use of flammable liquids. Candidates should have read the question and picked out the salient points ie words or phrases such as 'amateur' and combined them with their knowledge of how arsonists work and how flammable liquids react to fire and produced answers that looked at strategic issues with a logical format. This approach could have pre-empted key issues that were clearly not evident within existing scripts.

Question 8.6: Discuss the influence of alcohol as a major factor in most fire deaths.

This question was poorly answered by all candidates that attempted it. Candidates lost marks by describing various scenarios associated with drunken people, and how they may die in a fire situation, cooking chips etc. Only one candidate knew the subject in sufficient depth to comment upon the effect of differing levels of alcohol in a persons body. Candidates need to focus and concentrate on factual scientific data rather than anecdotal experiences or thoughts. Candidates are recommended to revise the study material associated with this subject prior to attempting a similar examination. This bibliography is 'A Guide to Fatal Fire Investigations' pages 46-47.

Question 8.7: Explain in detail how 'Char Depth' can be an important indicator of the behaviour of fire.

This was not a popular question but the majority of scripts submitted achieved reasonable scores. Candidates who showed/demonstrated a good understanding of charring and who mentioned the 'arrow theory' achieved additional marks. Candidates that achieved a pass mark made note that the study of charring is not an exact science and is not a linear phenomenon. Interpretation of charring is dependent on other factors that a Fire Investigation Officer would gather as part of the overall evidential gathering process associated with the incident.

Question 8.8: Provide a practical training guide of 'Points to Observe' for firefighters and officers who are called to give evidence in court.

A popular question with some candidates achieving excellent scores. At the other end of the scale were those candidates that lost marks by listing information that would be taken from the Fire Report, rather than concentrating on how to behave in the Court Room environment. Candidates scored well if they mentioned such issues as: 1) Being prepared, refresh memory, documents etc.; 2) Do not exaggerate or be biased; 3) Remain cool and avoid ill considered replies if pressurised. This is not an exhaustive list, this will be found on pages 68-71 of the 'Guide to Fatal Fire Investigations'. Candidates must familiarise themselves with this publication prior to attempting to answer this type of question in the future.

Paper 9 - Marine Fire Studies

Question 9.1: The laws of salvage have an important bearing on the role and responsibilities of the fire officer. a) Discuss the implications regarding any liability, and b) Explain the agreement covering salvage claims.

Approximately 50% of candidates attempted this question but unfortunately few achieved a pass mark. Candidates generally demonstrated a scant knowledge of this subject, which is surprising as this is a common question and candidates should have therefore prepared themselves more thoroughly. At Membership level it is expected that candidates would have an appreciation of the Salvage agreement but this year the depth of knowledge did not manifest itself in the submitted scripts. Candidates are recommended to revise the subject prior to any future attempt at this or equivalent examinations.

Question 9.2: With regard to fixed fire extinguishing systems, describe the requirements of a Carbon Dioxide flooding system used to protect machinery space on a ship.

There were several excellent scripts submitted for this question, and it was clear early on which candidates had a grasp of this subject and those whose answers digressed in more general aspects of CO₂ installations. Good marks were awarded to candidates who could satisfy the requirements of the question and who included descriptions on the CO₂ requirements and operating principles. Comments like 'must be stored in areas conforming to the required standard' did not attract marks. This is a specialist area and it is imperative that candidates, especially at this level, adequately prepare themselves for this subject matter.

Question 9.3: a) Briefly describe the different types of passenger ships; and b) Explain the unique construction features that are common to them all.

The Bibliography associated with this question is contained within pages 100-103 of the Marine Fire Studies manual. Candidates were more comfortable answering the first part of the question and many scripts gave adequate descriptions of the following types of passenger ships: 1) Cruise Liners; 2) Passenger Ferries; 3) Inland Waterway Cruise Liners; 4) Combined

Passenger and Cargo Carriers. The majority of candidates did demonstrate an in-depth knowledge of the SWATH type of cruise liner. Once again candidates would be well advised to study the syllabus and not to rely on general knowledge.

Question 9.4: a) Describe and explain the purpose of loadline marks; and b) Describe the implications of the loadline convention.

The question was answered very well by candidates who demonstrated an excellent grasp of this subject with the inclusion of accurate diagrams explaining the principles of load lines and how it is used in various sea conditions. The only area that candidates regularly lost marks on was the implication of the load line conversion, and this should form the basis of future study.

Question 9.5: Describe the measures that a fire brigade will need to consider in the planning and implementation of firefighting operations to ensure the safety of personnel.

The question required a description of measures to ensure firefighting safety. Both the planning process and implementation process should have been considered. The subject is wide ranging and so has to be tackled logically under broad headings. Detailed descriptions of specific measures were not required as this would take too long to answer. Candidates tended to give descriptions of personnel protective clothing and operational procedures, consequently other measures were ignored. The answer should have started with hazard identification and risk assessment in the planning process. This would naturally lead on to control measures including selection of personnel, equipment, safe operating procedures, training, PPE information and supervision. When a question requires a broad knowledge it is best to plan your response first so that thoughts are presented logically without repetition. A short time spent planning can save valuable time later on.

Question 9.6: Explain what information that a Stability Officer will require and need to record to monitor a ship's stability status during firefighting operations.

This was a very popular question and candidates generally achieved a pass mark. Probably because this question is common throughout both the Graduates and Membership papers, it was not unsurprising that candidates had little difficulty translating the information collected on a stability board into words and explaining how this information should be used. Some candidates did however lose marks by not recognising the usefulness of the information collected. At Membership level it is not sufficient to merely produce a list of items, candidates need to show that they fully understand what is behind the list and the implications of the information presented.

Question 9.7: Passenger ships and cargo ships of 500 tonne or more are required to carry a fire control plan in a 'Fire Wallet'. a) Where should the wallet be located; b) What other plans may be included in the wallet, and c) Describe what information a fire officer should expect to find in the fire control plan.

What an opportunity to achieve relatively easy marks, four of which were available for correctly answering parts a and b. Part c proved to be the main area where candidates failed to achieve the 13 marks that were available for describing the ten different types of information that should be included on the 'fire control plans'. Listed below are five of the ten, which could have improved scores to that of a pass: 1. The position of control stations; 2. Particulars of the fire alarm system; 3. Fixed and portable fire appliances and firefighting equipment; 4. The sections of the ship enclosed by fire resisting bulkheads; 5. Means of escape to the various decks and compartments. Fire Service Manual Volume 2 (Fire Service Operations Marine Incidents - pages 44, is the associated bibliography for the question, and due to the number of times this 'old chestnut' shows its face, candidates are recommended to make themselves fully conversant with this subject.

Question 9.8: Compare and contrast the problems associated with transferring personnel and equipment onto ships at sea and onto fixed offshore platforms.

Most candidates submitted very good answers to this question and secured an easy pass. The question called for comparisons and contrasts; most candidates were able to describe similarities, but the better answers also picked out differences between ships and platforms. There are two main methods of reaching vessels and platforms offshore; these are helicopters and tugs; by taking each one in turn and relating them to the two scenarios, candidates could have gained valuable marks. Also, some candidates achieved additional marks by describing the use of cranes and derricks. This question is best tackled by planning the answer; otherwise it would be too easy to miss important points. A simple matrix to plan your answer should prevent this from happening.

Paper 10 - Petrochemical Fire Studies

Question 10.1: a) Describe the stages and processes for obtaining polyethylene or polypropylene from crude oil. b) Distinguish between stages that involve physical and chemical processes, and explain the function of any catalysts involved. c) Explain the hazards associated with the different product streams, noting in particular how these will be influenced by the temperatures and pressures typically used.

It was quickly apparent due to the small number of attempts and the quality of submitted scripts that few candidates held sufficient knowledge regarding ethylene cracker to gain enough marks to secure a pass mark. Candidates generally lost marks by not answering the third part of the question which asked for an explanation of the hazards associated with the different product strengths, with particular reference to influences from temperature and pressure. Candidates must therefore revisit this area of questioning before taking this or another examination.

Question 10.2: a) Sketch a graph showing how the vapour pressure, lower and upper explosion limits of a typical hydrocarbon vary with temperature; b) Indicate the region on the graph where autoignition can occur, and the position of the flash point; c) Explain why such information may be useful in assessing the safety of a refinery process, particularly during start up or shut down.

This was a popular question with many candidates submitting well executed diagrams which clearly defined the areas required by the question. Section C required the most thought, and answers should have included issues such as: (a) Refining plants should operate as far as possible outside the flammable range; (b) Inert gases may form an integral part of start up and shut down procedures.

Question 10.3: a) Describe circumstances in which static electricity may create a hazard in a petrochemical plant, and plant making bulk polymers in a powder form. b) Explain why not every static spark can cause ignition, and the precautions typically used to control the risks from static.

Generally this question was answered well with candidates demonstrating through their answers that they had a good knowledge of this subject. Marks were commonly lost in the second part of the question which asked for the precautions typically used to control the risks from static. Candidates who included the following points scored well. (a) Earthing all metalwork, drums, vehicles, etc. before transfer starts; (b) limited use of highly insulated plastics for pipework, gaskets, etc; (c) restricting flow rates when pumping. The comprehensive list can be found in the associated bibliography for the question. Candidates are reminded to revise the subject as this is a common question in the petroleum environment.

Question 10.4: a) Distinguish between storage facilities for gases under pressure, gases liquefied under pressure, and

refrigerated liquefied storage; and b) Give examples of products stored in each way. c) What methods are available to provide fire protection for each of these types of storage facility? d) Explain what is meant by a bleve, and describe the consequences of a bleve of a large storage tank.

An excellent opportunity for candidates to score well with this question; and it was pleasing to note that all attempts gained a pass mark. If there was a weak area, this was part c which asked for an explanation of the types of fire protection that could be employed to protect these storage facilities. The three options that satisfy this explanation are incorporation of one or more of the following: (a) provision of fixed water spray protection; (b) soil mounds surrounding storage tanks; (c) passive fire protection.

Question 10.5: a) In the context of hazardous area classification, define the terms zone 0, 1 and 2. b) Explain why a hazardous area classification study may be useful in controlling the selection of fixed equipment, the movement of vehicles, or maintenance work. c) Describe three ways in which electrical equipment can be designed and constructed to prevent it causing an ignition of a flammable atmosphere. d) Ignition protected electrical equipment is often marked with a 'T' rating (T3, T4 etc). Explain the meanings of these ratings.

This question is an 'old chestnut' and candidates were adequately prepared for its inclusion in this year's examination. The majority of candidates submitted excellent scripts. Candidates who lost marks generally did so in failing to provide a detailed explanation of the hazard area and the relevance of the 'T' rating. Through revision candidates could quickly refresh their knowledge of these two areas of concern.

Question 10.6: You have been appointed to the position of full time fire officer for a moderate sized chemical process plant, with some tank storage. You have a team of plant operators who you are to train in fire fighting. The state/municipal fire brigade are capable of providing an initial fire fighting force within 15 minutes of alert. Describe the types of specialist moveable fire fighting equipment that you might expect to provide on site, the types of fire that each would be useful for, and outline any special training requirements for the use of this equipment.

Although this was a popular question and candidates generally achieved a pass mark, common mistakes or omissions of detail were evident throughout the range of submitted scripts. At membership level detailed answers are required from candidates, and scripts submitted that failed to mention obvious points failed to achieve full marks; such points are: (a) on-site water supplies; (b) training requirements; (c) why a ground monitor may be more beneficial than a branch.

Question 10.7: a) Explain what is meant by the term 'roll over' in a refrigerated storage tank, the circumstances in which it can lead to ignition of an explosive mixture in a long pipeline, and describe the causes and consequences of an actual incident of a large vapour cloud explosion. b) Give three examples of ways in which pre-planning may help in mitigating the consequences of a major incident.

A very poorly answered question with candidates failing to demonstrate a sound knowledge of this subject. However, good marks were awarded to those who were familiar with and described an actual incident, such as that at Flixborough. Candidates are therefore reminded to study the subject prior to any future attempt at a Petrochemical examination at this level.

Question 10.8: a) Transfer of bulk materials from ship to shore, or rail/road tank car to fixed tankage gives rise to the risk of a major spillage. Give examples of sources of information giving advice relevant to these risks. b) Explain the function and method of operation of: (i) breakaway couplings, (ii) overfill protection devices, and (iii) remotely operated shut off valves or emergency shut down systems; c) Outline the considerations relevant to means of escape from a ship to shore transfer facility, and how

these will depend on whether the water is tidal, static (as in a dock), and whether the ship is moored to the end of a jetty or alongside a quay.

Very few candidates attempted this question, but those that did all gained a pass mark. There was a good knowledge of the issues in parts b and c of the question, but surprisingly where candidates had the opportunity to demonstrate their knowledge of codes of guidance, etc. very few submitted scripts had sufficient detail to achieve the full marks available for this part of the question.

Paper 11 - Disaster Planning and Emergency Management

Question 11.1: Explain the difficulties in identifying bodies immersed in water following a mid-air explosion resulting from terrorist activity.

A popular question which attracted some very good scores, examples of the difficulties in identifying bodies are as follows, the full list can be found in the associated bibliography: (a) facial trauma; (b) prolonged immersion; (c) loss of limbs; (d) effect of high temperature on bodies. Candidates on occasion strayed from the requirement of the question and lost marks by detailing the methods of identification re. dental records, etc. With this point in mind with a view for achieving maximum marks for the knowledge available, candidates must read the question and understand its requirements prior to answering.

Question 11.2: Give an overview of the health & safety considerations at a major disaster implicating a large number of victims over a wide geographical area.

Generally a well answered question with candidates needing little encouragement to realise the available marks. For many this was an opportunity to demonstrate their depth of knowledge of this subject and from these candidates excellent scripts were submitted. Others, however, lost marks by either adopting an essay style approach or listing irrelevant information such as mortuary arrangements and incident management. Answers should have included issues such as: moving vehicles, landslides, exposure to public and would-be rescuers. Candidates could have focused on the generics of health and safety management applicable to operational incidents, then highlighted other points specific to the scenario given. If this approach had been adopted and a logical sequence applied to laying out the answer, candidates could have achieved additional marks and achieved a better pass mark.

Question 11.3: Many post-disaster enquiries highlight failures in communication affecting the efficiency of first responding agencies. Discuss how this might be improved.

Not a very popular question, with candidates generally failing to achieve a pass. This was surprising with the regularity of communication failures reported at major disasters. Some candidates over elaborated on command and control structures and submitted scripts containing in-depth explanations of the different communications media available. This information was not required by the question, and candidates therefore lost marks. When candidates review the associated bibliography to this question, they may realise their answer should have contained the following types of information: (a) dedicated communication systems capable of being reinforced as quickly as possible; (b) careful selection and use of forward co-ordination points; (c) inter-service communication capability.

Question 11.4: The media are often accused of being 'intrusive' when hearing of a major civil disaster. Discuss ways in which the media role can be made more positive.

Some very well presented scripts were submitted for this question. It was quite obvious that candidates not only relied upon the material within the bibliography, but also their own personal experience of dealing with the press. Many candidates

spent an inordinate amount of time explaining why the media had a legitimate right to attend incidents, at the expense of ways in which their role could be made more positive. The better answers recognised why conflict can occur with the media and explained how we can make the media's role more positive by the inclusion of issues such as providing good facilities, vantage points, control media points, etc.

Question 11.5: Provide an overview of the legal issues that implicate the local administration in planning to mitigate the effects of a major disaster.

This has been acknowledged as a difficult question – this conclusion was reached by the relatively few attempts made and the lack of detail submitted; candidates therefore had not adequately covered this subject prior to the examination. Some candidates didn't read the question properly and only attempted the first part, which focused around the legal framework. Issues associated with the 'planning framework', which was the second part of the question, are as follows: (a) formation of plans – which should be flexible; (b) implementation – call out and standby arrangements; (c) staffing – activation of core team; (d) liaison – defined roles/lines of communication; (e) training – of key personnel in communications and logging procedures; (f) phased approach – immediate and long term responses; and (g) development – plans need reviewing and updating regularly and involve all response agencies. Candidates must therefore adequately prepare themselves for this type of question.

Question 11.6: Discuss the benefits of training to prepare support agencies in dealing with disaster, and highlight any difficulties.

A very popular question with the candidates that stuck to the question's requirements achieving excellent marks. As with the previous question, there were candidates attempting to answer this question but forgetting to answer both parts. Candidates demonstrated an excellent knowledge of the benefits associated with joint training arrangements, but couldn't submit detailed discussion on the difficulties that may arise – i.e. the cost of training, the planning required to achieve multi-agency training and lack of co-ordination could result in wasted resources. It is therefore recommended that candidates review the associated bibliography for the question prior to any future attempt at this or any other equivalent examination.

Question 11.7: Highlight the key features of an emergency plan to deal with a risk involving a toxic substance used in a manufacturing process.

Generally a well answered question which provided candidates with the opportunity to demonstrate their knowledge regarding the subject. It is important to identify the nature of the risk from the toxic substance and develop the emergency plan accordingly. Good marks were awarded to candidates who followed a simple logic of cause and effect.

Question 11.8: The Police Service 'should have overall control of the response to a major disaster'. Discuss.

This wasn't a very popular question where many candidates failed to focus on why the police should have overall control of the response to a major incident. Good marks were awarded to candidates who not only were confident enough to explain why the police should have overall control, but also why they should not. Broad areas of answers were issues like: (a) the statutory powers of the police to co-ordinate the activities of the emergency services; (b) the police have a wider influence than other emergency services, particularly in mass murder enquiries; (c) the police can 'detach' from the immediate firefighting actions and provide strategic command early on in an incident. The complete model answer can be found in the bibliography associated with this question.

Graduateship Examination

Paper 1 - Fire Safety

Question 1.1: Briefly discuss the principles associated with the positioning of smoke detectors within buildings.

Strangely for a straightforward subject, this question proved to be relatively unpopular with candidates. Candidates failed to appreciate the key words in the question which were “Principles associated with the positioning of smoke detectors”. Those that didn’t comprehend the question’s requirements and whose answers drifted away in realms of describing in detail the types, design and mode of operation of detectors joined the majority of those who failed to achieve adequate marks to secure a pass. Those candidates who mentioned air movement, heat invasion, voids and obstructions, etc. fared better.

Question 1.2: List and briefly discuss points for consideration for the siting of portable fire extinguishers.

Candidates generally could have achieved higher scores and secured passes if they confined their answers to what was being asked by the question. All too often candidates displayed their wealth of knowledge regarding the type, use and operation of fire extinguishers; also, extinguisher training and maintenance were occasionally covered in some detail. The question demanded answers that made mention of uses, such as: (a) Fire extinguisher location should be conspicuous and accessible for immediate use; (b) Position next to stairways, corridors, exits or landings to enable safe retreat. Candidates must therefore read and understand the question. The bibliography associated with this question can be found within the IFE Handbook for Fire Engineers.

Question 1.3: Comment upon the behaviour of the following types of beam in a fire situation: a) Timber; b) Steel; c) Reinforced Concrete

This was the most popular question of this paper, and some excellent scripts were submitted. The answer is clearly covered in the Stationery Office Fire Service Manual, Basic Principles of Building Construction. It was pleasing to note that due to the number of attempts at the question and the high success rate, candidates had prepared themselves for this subject. Unfortunately, some candidates chose to list rather than comment, and therefore failed to cover the question requirements and lost valuable marks.

Question 1.4: a) Define the term ‘fire door’ and detail its main functions; b) What features are required for a door to be used for smoke control purposes?

It gradually became obvious that candidates held only a superficial knowledge of this subject. For those astute candidates who appreciated that the answer was in the question, i.e. fire door versus smoke door, a quick comparison between each was sufficient to earn a respectable pass mark. At Graduate level, with this type of open question, candidates would not need an in-depth knowledge of this subject to achieve a pass; pure guesswork could, if produced methodically, attract adequate marks to achieve a pass.

Question 1.5: Detail the different types of building boards that may be encountered and comment upon their characteristics and behaviour in a fire situation.

This was a question of two halves. Firstly, detail the different types of building boards, and secondly comment on their characteristics and behaviour in a fire situation. Generally, those candidates who had studied the question and understood its requirements, and had covered both parts achieved very good pass marks; however, frequently scripts were submitted focusing only on detailing the types of boards to be found – for those candidates it generally ended in a failure. My advice therefore is to fully read the question prior to attempting to answer.

Question 1.6: The risk of fire is much greater when outside contract workers are on the premises. Briefly describe the precautions that can be introduced to minimise such risks.

Although this was a popular question, candidates again drifted away from what was being asked for; the submission of general fire safety

advice was not adequate to attract sufficient marks to attain a pass. Marks were therefore obtained by answers that contained detail on such issues as: (a) Hot work permits; (b) Possible isolation of fire detection system and/or electrical supply. This subject appears fairly regularly with IFE examinations; it is therefore recommended that candidates familiarise themselves with the associated bibliography.

Question 1.7: In places of public entertainment, where the manager is responsible for staff training in respect of fire precautions and evacuation procedures; a) Discuss the areas to be covered in staff instruction and training; and b) What details should be recorded in the staff-training log?

This question was generally answered well by candidates; when points were lost, these all too often were due to the exclusion of detail regarding the importance of fire doors and the knowledge of the method of operation of any special escape door fastenings. Some candidates failed to read and understand the questions, and subsequently failed to score highly as they approached the answer focusing on the workplace, rather than a place of public entertainment.

Question 1.8: Describe the physical differences that are apparent in slow and fast developing fires

It is recommended that candidates include for future revision the bibliography associated with this question. This question lended itself to the inclusion of well executed diagrams; these and explanations around typical structural elements enabled the candidates to score well. Five of the twenty marks available were obtainable by candidates who described both slow and rapid growths in developing fire, unfortunately these marks were seldom awarded.

Question 1.9: State and briefly describe the initial observations and actions that the OIC (Officer in Charge) of the first attendance at a fire should take, and make note of, which may be of great assistance when later carrying out an investigation into the cause.

Candidates who scored well with this question did so because they answered the question that had been set. All too many candidates wasted time and scored no marks by failing to understand the question and detailing the operational tasks that require implementation, rather than the initial observations which might assist the officer in charge when later carrying out an investigation. Examples of the type of areas where marks could have been awarded are as follows: (a) Floor or room where the fire is issuing; (b) The pattern of fire spread; and (c) The colour of smoke and flame. Candidates must read the question and understand what’s required before attempting to answer.

Question 1.10: State the three categories of automatic detector. Explain how these categories are further sub-divided and for which type of fire each detector is most suitable

Although this proved to be an unpopular question, excellent scripts were submitted. The only comment I can make regarding areas where full marks were not achieved were by the exclusion of information regarding “Line Detection”. Some submissions included excellent diagrams that explained how detectors worked in fire situations, but as this was not what had been asked for, no marks were awarded.

Paper 2A - Operations

Question 2A.1: Explain in detail the contents of a ships fire plan.

With the exception of a few candidates who achieved excellent scores for this unpopular question, the majority relied upon practical experience to answer this question; all too often candidates wasted time mentioning irrelevant information such as methods of fighting fire aboard ships. The question was specific – the model answer is short and focused and mentions the following points: 1. The position of control stations; 2. Particulars of the fire alarm system; 3. The means of access to the various decks and compartments. The model answer can be found in the Manual of Firemanship Book 4

Question 2A.2: Describe the operational procedure that should be followed when attending an incident involving an Acetylene cylinder

Unsurprisingly this was a popular question for this year's candidates. However, submitted scripts lacked detail and depth of knowledge; and few candidates attained sufficient marks to attain a pass. For those operational personnel who attempted this question, it was hoped this would be a chance to attain excellent marks, but answers lacked a methodical approach and some procedures offered could have disastrous consequences if actioned – examples of these departures from the model answer were: 1. The removal of the cylinder prior to cooling; 2. Moving people upwind; 3. No mention of hazard zone, 150 metres from the cylinder. For the sake of future examinations and personal safety, candidates are asked to prepare for this type of question by revising the associated bibliography.

Question 2A.3: Discuss the skills that a specialist decontamination team should possess and detail the equipment that the team will require.

Candidates who had access to or who had adequately studied this subject were able to produce quite comprehensive lists of equipment that specialist decontamination teams should rely upon in the execution of their duties. What was a challenge to candidates was the inclusion in their submitted scripts of information that is contained in the following passage. For some, these additional four marks could have made the difference between passing and failing: "Officers who have received appropriate training and have a knowledge of or interest in chemistry and chemicals should be able to act as supervisors if this is necessary in the absence of a specialist advisor to fulfil the role. A number of suitably trained fire service personnel who have the skills to use the equipment and act as operatives."

Question 2A.4. Detail the contents of an 'operational procedures' note for the management of environmental pollution.

This was an unpopular question and generally candidates failed to achieve a pass mark. The requirements of the question were seldom achieved, and where attempts were made, insufficient detail probably associated with inadequate revision strategy prevented candidates scoring high marks.

Question 2A.5. Discuss advantages/disadvantages of a Turntable Ladder for fire fighting purposes, against those of a Hydraulic Platform.

This will be regarded by many candidates as a lost opportunity. Candidates tended to generalise their answers and by describing what a hydraulic platform/turntable ladder was what they were capable of, but this was not required! The question wanted a comparison between the advantages and disadvantages. Answers should therefore have included the following points; this is not an exhaustive list, and candidates are reminded to review the syllabus: Advantages: Appliance is shorter, therefore access areas are improved. The cage where fitted can be removed to provide extra flexibility. Disadvantages: Limited reach over buildings. Less stable working base due to size of unit.

Question 2A.6. Detail the essential features of a communications system for use with Breathing Apparatus.

Understandably, this was a popular question especially for overseas candidates. It was, therefore, surprising that the scale of awarded marks was low. An improved detailed knowledge of this type of equipment is therefore required. Other candidates did themselves an injustice by failing to read and understand the question and wasted time detailing breathing apparatus procedures rather than what was required.

Question 2A.7. Explain the general techniques that should be adopted when dealing with 'metal' fires.

Questions associated with metal fires appear in this examination with some regularity; candidates were aware of this and had studied the subject in some depth. Some excellent scripts were received, but points were lost by candidates who failed to demonstrate their knowledge of detail associated with this subject. An example of this statement is candidates who mentioned the using of the 'correct extinguishing media'! What media?; there were four marks available

if candidates had made mention of Talc, sand, soda ash and limestone.

Question 2A.8. List and discuss the factors that must be considered when dealing with a lift rescue.

The use of lifts and attendances to lift rescues are commonplace throughout the developed world. It was therefore disappointing to see such little detail regarding this subject being submitted; few candidates submitted sufficient relevant information to achieve a pass. Many candidates relied upon practical experience rather than listing and discussing all the main considerations. The bibliography associated with this question is contained within the Manual of Firemanship Book 12. The points to consider are too many to list in this booklet; candidates are therefore asked to revise this subject prior to future attempts at this type of question.

Question 2A.9. A fire in a tunnel presents particular problems for the officer in charge. a) Detail the problems that are presented; and b) Detail what actions are needed to control the situation

One overseas candidate achieved full marks for this question. Generally, this proved to be very popular with the majority of candidates, who demonstrated an in-depth degree of knowledge associated with this subject. It was however clear that candidates who submitted scripts followed the requirement of the question, i.e. were divided into 'The problems that are presented and detail what actions are needed' generally fared better than those who lacked direction and forethought, and those whose scripts usually contained a wealth of repetition.

Question 2A.10. Describe in detail the problems associated with the provision of air supplies for personnel fighting a fire in pressurised workings.

This was an unpopular question, with candidates being confused between 'pressurised working' and 'positive pressure ventilation'. Other unsuccessful scripts contained detailed answers focusing on the generic problems associated with working in tunnels, but at the same time failing to address the specific issues associated with 'pressurised workings'. However, it is not all doom and gloom; high marks were occasionally awarded to those candidates that adequately expressed their knowledge regarding the duration of the BA set, the effects on the body, and the requirement for decompression when working in pressurised atmospheres. The Manual of Firemanship book 6 is specific on this subject; and candidates are recommended to review this information to broaden their understanding of this subject.

Paper 2B - Communications

Question 2B.1. What factors should be taken into account when positioning a Control Unit at an incident?

Question 2B.2. Give a detailed explanation of a 'leaky feeder' system.

Question 2B.3. Explain the mandatory and technical considerations to be taken into account when considering ground to air communications.

Question 2B.4. Give a detailed description of the principals of a trunked mobile radio system.

Question 2B.5. List the potential benefits of A.V.L.S.(Automatic Vehicle data Location Systems) within the Fire Service.

Question 2B.6. Provide a note for guidance for operational crews regarding the use of radios in hazardous environments.

Question 2B.7. Describe in detail the path of an emergency services call from a cellular telephone to an emergency authority control room.

Question 2B.8. Your Brigade is considering the use of a vehicle mounted mobile data system. Consider and report on: a) The implications for the Brigade; b) The typical data that could be stored and/or transmitted to and from the vehicles.

Question 2B.9. Describe the techniques that should be applied by a Control Operator in order to extract relevant information from a person placing an emergency call.

Question 2B.10. Discuss the disadvantages of the use of radio with Breathing Apparatus.

Paper 2C - Aero Studies

Question 2B.1. In relation to fire-fighting and rescue facilities at aerodromes, explain in detail the meaning of "Critical Area Concept"

The 'Critical Area' is a concept for the rescue of occupants of an aircraft. This question was popular with candidates, many of whom demonstrated an excellent depth of knowledge and achieved excellent pass marks. The use of graphs and formulae assisted the candidate in answering this question, but reference to response areas both wasted time and lost marks.

Question 2B.2. Discuss the provision of rescue and fire-fighting vehicles, their specifications and characteristics for aerodromes with category 3 and above.

It was disappointing that, firstly this was an unpopular question; and secondly that so few candidates demonstrated sufficient knowledge to secure a pass mark. The detailing of firefighting media such as BCF, dry powders, foam and water was not required by the question, and consequently no marks were available to those candidates whose answers centres around such matters. It is an interesting subject matter which should have been seen as an opportunity to attain relatively easy marks by those employed in aviation. As a guide to the type of answer that was required is listed below; a more comprehensive answer can be found in the appropriate bibliography written by Dr R.W. Docherty. 1. Appliances must have all-wheel drive capability; 2. Top speed of 100 km/h; 3. Have a cruising speed of 80km/h; 4. Major foam tender appliances must be able to produce whilst on the move at 8 km/h.

Question 2B.3. Outline the essential design features of passenger aircraft construction.

With a bit more thought and the adoption of a methodical approach, candidates who attempted this popular question could easily have achieved higher marks. Those candidates that adopted that mantle scored well with the inclusion of information regarding: fuselage, wings, tail unit, engines and undercarriage, etc. Those that didn't hold sufficient knowledge regarding the subject and failed to elaborate on the areas mentioned above lost the valuable marks that were available. Confidence for a subject arises from a sound revision strategy and candidates are therefore reminded to adopt this principle prior to attempting future examinations.

Question 2B.4. Discuss in detail the access and evacuation systems in place within large passenger aircraft.

The majority of candidates failed to read and understand the requirements of this question, which asked for a detailed discussion on the evacuation systems within large passenger aircraft. By that definition it was not sufficient to produce a list answer. Detailed discussion was required in the following subjects: doors, escape chutes/slides, escape lines, emergency hatches/exits, and cut in points. Revise the subject and correctly apply that knowledge to a given question.

Question 2B.5. When dangerous goods are being transported by an airline, they must be accompanied by a dangerous goods transport document or shippers declaration for dangerous goods. List the information found on these documents.

Adequate knowledge of this subject could have produced relatively easy marks as the question merely asked for the production of a list. The majority of candidates that attempted this question had that level of knowledge and scored high marks. At the other scale were those candidates who were obviously ill prepared in this subject matter and failed to produce an adequate answer; and it is to those candidates and those who may attempt this paper next year that I make the recommendation to invest time in preparation.

Question 2B.6. List the categorisation of emergencies at aerodromes and define the following: a) Aircraft Accident; b) Full emergency; c) Domestic fire

This developed into a paradox. The most popular question attracting the worst scores compared to other questions. For those fire engineers involved in aviation, this was a gift. Three of the categories were given to you in the question; others are: local standby, aircraft accident imminent, and special services. Some

candidates who attempted to extrapolate the list of categories provided failed to add definitions for a, b and c, and therefore were not in the running for half of the marks that were available for this question.

Question 2B.7. Define the terms "low speed" and "high speed" accidents and briefly discuss the actions of the fire and rescue service at these types of incidents.

Candidates demonstrated a general limited knowledge of the difference between low and high speed aircraft accidents. If candidates had realised one was survivable, and the other non-survivable, they could have spent time developing a methodical approach, looking at strategic issues associated with these types of incident; this would have prompted key issues and a possible pass mark.

Question 2B.8. Describe the requirements of an airport fire station training programme.

Although the model answer is not exhaustive, but rather gives a basis for such a training programme, it is specific in the relationship between practical and theoretical training, and recommends a division of 75% and 25% respectively; very few candidates made mention of this relationship, and also all too often failed to provide sufficient detail to warrant a pass. Candidates rather focused their answers towards what they do on their stations, rather than developing their knowledge through revision to improve their understanding of this subject.

Question 2B.9. Discuss the movement of wreckage and the practice of de-fuelling.

Home candidates fared better with this line of questioning, grouping the principles of post accident discipline and the preservation of evidence posed little problem. Only one candidate, however, demonstrated sufficient knowledge to attain a near perfect score; others need to undertake additional revision to be able to apply adequate definition to the areas of the use of tags, photographs, videos, flight recorders, and the movement of wreckage, that would ultimately result in a personal pass mark.

Question 2B.10. Discuss the main factors that need to be considered in choosing a heliport site.

Description of a generic approach to helicopters would have produced answers of sufficient detail to warrant a pass. Candidates obviously need to concentrate their efforts to undertake additional study towards this subject to that the next time they would feel confident to discuss such issues as: vehicle access and parking facilities; noise disturbance; helicopter size and rotor diameter. Candidates' attention is therefore drawn to Dr R.W. Docherty's publication 'Airport and Aircraft Fire Protection, Fire Fighting and Rescue Techniques'.

Paper 3 - Fire Engineering Science

Question 3.1. Construct a graph of Jet reaction (in Newton's, at a pressure of 5 bar) against values of nozzle diameters from 12.5 mm to 30 mm, On the same axes, draw a second graph for a pressure of 3.5 bar. By extrapolation estimate the jet reaction for a 35 mm diameter nozzle for both pressures.

This question was attempted by a large number of candidates and attracted a high pass mark. The question was in two parts and required the candidate to calculate the jet reaction for a given number of nozzle sizes and plot the result on the graph. This information can then be used to calculate by extrapolation the jet reaction of a 35mm nozzle. A few candidates lost marks by calculating the jet reaction and not using the graph. Generally, a good result.

Question 3.2. A turntable ladder used for bridging has an extended length of 30m with its unladen centre of gravity 16m from the head of the ladder. The mass of the ladder alone is 1,600 kgs. (a) Calculate the position of the centre of gravity of the ladder with a load of 150 kgs at the head. (b) If the combined centre of gravity must not be closer than 14m from the head of the ladder, determine the maximum permissible load at the head.

Few candidates attempted this question and the pass mark was very

low. The question was in two parts, requiring the candidate to calculate the centre of gravity of a turntable ladder with a given load and use this information to calculate the maximum load for given information. Few candidates completed this task successfully.

Question 3.3. *At an incident the only source of water is a private swimming pool which measures 15m x 5m with a sloping bottom from 3m to 1m. The incident commander requires 3 jets operating from 70mm hose working at a nozzle pressure of 7 bars from a pump set into the swimming pool. Assuming the pool can be completely emptied, how long will the water last?*

This question was attempted by a large number of candidates and attracted a high pass mark. The question was in three parts and required the candidate to calculate the capacity of a swimming pool and use this information to determine how long the supply would last when supplying a number of firefighting jets. Generally a good result but a few candidates lost marks by failing to show formula and FULL working.

Question 3.4. *A two core copper cable is 70m long. At the far end there is a load drawing 60 A and the terminal voltage at the load is 240 v. The maximum voltage available at the supply end of the cable is 246 v. (a) What is the maximum practical resistance of the cable? (b) What is the smallest cross sectional area of copper which can be used? (c) What will be the power loss in the cable? (Resistivity of copper 1.6×10^{-8} ohm metre).*

This was a popular question with unfortunately few candidates achieving a pass mark. Marks were lost by candidates failing to identify the voltage drop in the cable and hence the resistance was calculated incorrectly. Some candidates did not understand how to ascertain the cross sectional area of the cable. Candidates can reverse this trend by practising examples of this question and working through the various formula for voltage drop and power loss calculations.

Question 3.5. *A steel vessel has a capacity of 2000 litres at 0°C and is completely full of a liquid. When it is heated to 20°C and re-cooled to 0°C the vessel loses 4 litres by spillage. Taking the co-efficient of linear expansion of steel as $0.00012/^\circ\text{C}$, evaluate the co-efficient of linear expansion of the liquid.*

Few candidates attempted this question and the pass mark was very low. The question required the candidate to calculate the linear expansion of a liquid within a container when both were heated. The major problem with this question was that candidates failed to use the correct formula and failed to show any formula or working in their answer.

Question 3.6. *A breathing apparatus cylinder has a water volume of 10.9 litres. When fully charged it is at a pressure of 200 bar at 15°C. (a) How many litres of free air does it contain? (free air is air at 15°C and 1 bar); (b) If it were charged at a higher temperature there would be less free air in the cylinder. At what temperature would there be 10% less free air? (Assume that the pressure is still 200 bar).*

This question was in two parts, which demonstrated two types of answers. Although the majority of candidates produced excellent scripts for Part (a), part (b) was generally either misunderstood, or candidates had obviously, by the poor standard of answer, not adequately prepared themselves for this type of question.

Question 3.7. (a) *Explain the term 'half life' as used in relation to particular radioactive isotopes and give the reason for its use. (b) Discuss the use of isotopes in ionisation fire detectors and radiological tracers used in medical diagnosis and state why the half-life should differ in each case.*

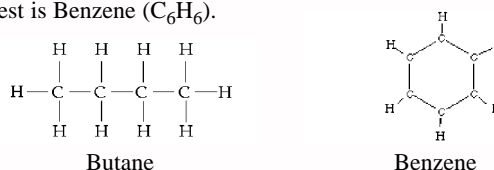
The majority of candidates clearly had not revised this subject thoroughly prior to the examination, submitted scripts which were flawed in content by the absence of detailed explanation of exponential decay and half life associated with these issues; many candidates missed the link and were unable to distinguish why a half life should differ between the isotopes used in fire detectors and radiological tracers used in medical diagnosis. Some candidates also wasted time and achieved no marks for detailing some with elaborate diagrams on how smoke detectors were manufactured.

Question 3.8. *Complete and balance the following chemical equations: $2\text{CH}_4 + 4\text{O}_2 = 2\text{CH}_4 + 3\text{O}_2 = 2\text{CH}_4 + 2\text{O}_2 =$ Name four simple products, which can be formed by the combustion of methane with air. In each case, state whether it is hazardous and give the type of hazard where appropriate.*

This question was attempted by very few candidates, and the pass mark was extremely low. The question required the candidate to balance a chemical equation and name the four products produced by its combustion. It was obvious that candidates had little knowledge of how to balance the equation, but the disappointment was the poor response to the product produced and the hazards they presented.

Question 3.9. (a) *State the two classes of combustible hydrocarbons and place the following into those classes: Butane, Benzene, Propane, Toluene. (b) Two of these compounds would tend to burn with a very smoky flame. State which two and explain why.*

Aliphatic and aromatic were unfortunately the two types of hydrocarbons that candidates on occasion were blissfully unaware of. Butane and propane are examples of straight chain aliphatic hydrocarbons. Butane's chemical formula is that of C_4H_{10} . Benzene and toluene are examples of aromatic hydrocarbons. The simplest is Benzene (C_6H_6).



With the diagrams above it can be seen that the lack of oxygen to the carbon atoms is more limited with the Benzene molecule, and therefore aromatic hydrocarbons produce burn with a smoky black flame.

Question 3.10. *In a water relay, two consecutive pumps have nominal discharges of 4500 lpm and 2250 lpm. The output through both pumps is found to be 2000 lpm at 7 bar. If the corresponding brake-power of the engines is 48kW and 36kW respectively, evaluate the efficiency in each case. Give an explanation of the significance of the differing values.*

A reasonably answered question with many candidates gaining a pass. Many marks were gained by students who set out the answer in a methodical manner and showed all calculations. Others showed little comprehension of the subject and are recommended to continue their studies for future examinations.

Paper 4 - Human Resource Management

Question 4.1. *Discuss the differences between Maslow's and Herzberg's theories*

This question was reasonably well answered with some candidates demonstrating a sound understanding of the two theories. Typically, marks were awarded for logical explanations of the theories, and those who could also discuss the differences. Marks were lost by candidates who could remember sufficient detail to compile a list but had carried out insufficient study to be confident enough to undertake detailed explanations. Approximately half of the candidates discussed Maslow's and McGregor's X,Y theories which was not asked for and therefore achieved 50% of the available marks. Candidates are therefore reminded that they must read the question and fully understand what is being asked for.

Question 4.2. *Detail means by which employees can be assisted to absorb an organisation's culture*

Despite it being an experience that we have all been through and ought to recall, the means whereby an organisation consciously or unconsciously has brought us to absorb its culture, it was disappointing that few candidates obtained high marks. The bibliography associated with this question is "Management Theory and Practice", 5th Edition, written by G.A. Cole. Revision of this subject would remind candidates that if they had mentioned management tools such as organisational rituals, logos, policy statements, etc, then a pass mark would have been easier to achieve.

Question 4.3. Describe the employer's common law duties for health and safety at work.

Few candidates achieved a pass for this question, which demonstrated poor preparation for this subject prior to the examination. The model details five common law duties, which are as follows: provision of safe place of employment; provision of safe means of access to work, the provision of safe systems of work; provision of adequate equipment, materials and clothing to enable employees to carry out their work safely.; provision of competent fellow workers; duty of care to ensure that employees are not subject to any unreasonable risks in the workplace. Further reading regarding this subject should be undertaken from the associated bibliography

Question 4.4. Discuss how training staff in an organisation can draw a comprehensive picture of current and potential shortfalls in training needs.

This was a popular question which interestingly produced scores at both ends of the scale. Few candidates included such issues as: 'analysing, interviewing managers, observing job performances, etc' achieving excellent scores, as opposed to those candidates whose answers drifted away from the requirements of the question, and regularly lost marks. Those candidates that may have a weak knowledge in this area are reminded to improve their revision prior to attempting a similar examination.

Question 4.5. Identify the general implications of information technology being installed within offices in an organisation.

This was a poorly answered question with only a handful of candidates achieving a pass mark. Marks were all too often lost by candidates who listed the advantages/disadvantages associated with the installation of information technology into the office environment; this was not what was required, and candidates lost time and attracted few marks by diverting their attention. Marks were awarded for the inclusion of the following information; the full list is available from the associated bibliography to this question – Office jobs will undergo significant change; routine office work will become considerably more cost effective; requirement for storage space will reduce.

Question 4.6. To use time spent at a meeting most effectively, detail questions a manager should consider when planning the meeting.

Too many candidates didn't read the question and produced totally irrelevant scripts of how a meeting is conducted or chaired which was not being asked for. Others attempted to answer the question by submitting a list. The question asked for details; therefore, those candidates lost valuable marks, which could have resulted in them obtaining a pass. Again, this was a classic example of not reading the question properly and thinking through the answer. Some of the issues that should have been addressed are: length of meeting; purpose of meeting; who should be invited.

Question 4.7. Examine long and short-term personnel requirements, which should be considered when planning an organisation's workforce needs.

Those candidates who attempted this question did not score high marks because they generally listed four or five points without offering any explanation. Some candidates also lost marks by producing well written but irrelevant scripts containing PPE, working environments, etc. If they had read and understood the question, they would have concentrated on issues such as recruitment, retirement, pay, etc. and having identified each section, provided detailed explanations of each. Candidates must therefore adequately prepare themselves for the task ahead and read the question properly.

Question 4.8. As a manager you are preparing to interview a member of staff who has a personal problem affecting their performance at work. Discuss the format the interview should take and describe the different forms of counselling you could use.

Unfortunately, most candidates failed to recognise that this was a two-part question where high marks could only be awarded if both parts were fully answered. Again, candidates failed to recognise the importance of the word 'discuss', and lost marks by the submission of an unsubstantiated list answer. The second part of the question proved more difficult for candidates as they failed to understand the principles of 'directive' and 'non directive counselling'; some were further confused and included references to disciplinary procedures.

Question 4.9. As a manager you have responsibility for undertaking safety risk assessments in premises under your control. (a) Define (i) Hazard, (ii) Risk; (b) List and describe five principal steps in carrying out safety risk assessments.

This was a very popular question and pleasingly the majority of submitted scripts attracted a pass mark. Most candidates displayed an excellent depth of knowledge for this important subject. As with other questions, however, some candidates merely produced a list answer which lost them marks. A small number of candidates disappointingly described the process to adopt when carrying out a fire safety inspection. Candidates are therefore reminded to read and understand the requirements of the question prior to attempting the answer.

Question 4.10. Summarise the skills and knowledge which can contribute to how managers convert their decisions into effective action and maintain standards and morale in the process.

Most candidates achieved a reasonable score with this question and appeared to draw their information from the study material and personal experience. Scripts that included issues such as decision making, applying technical knowledge, maintaining discipline under the umbrella of skills and knowledge of policies and long term objectives, and human behaviour scored well. This is, however, a comprehensive subject, and candidates are reminded to familiarise themselves with the associated bibliography.

Intermediate Examination

Fire Engineering Science

Candidates were comfortable with the subjects contained within questions 1-3; many candidates achieved excellent marks which confirmed they had adequately prepared for this paper.

The story changes, unfortunately, for questions 4 and 5; these two questions, and in particular question 5 appeared to confuse candidates, with few achieving a pass. Question 5 was: The current flowing through a 4 megaohm conductor is 6 milliamps. Calculate the power being generated (state your answer in watts).

Power = $I^2R = 0.006 \times 0.006 \times 4000000 = 144$ watts.

This paper has obviously opened the eyes of the Intermediate candidate, and some have realised that additional study is required prior to any other attempt at this or any other similar examination.

Operations

The first four questions within this section offered little challenge to the candidates; some walked away with excellent marks. There was, however, more of a problem with question 10. This question was asking for four considerations from a list of six on what to take into consideration when siting breathing apparatus control points. Breathing apparatus plays an increasingly important role within fire engineering operations, and candidates therefore must be adequately conversant with its disciplines.

Fire Safety

The majority of candidates scored well throughout the fire safety section; it was pleasing to note the depth of knowledge held by candidates for the five given subjects.

Some candidates, however, lost valuable marks, notably in questions 13 and 14 by not reading and understanding the requirements of the question; those candidates' answers deviated into other subject matters.

If there was one question amongst the five that gave candidates the most problem, I would have to say it was question 11. Candidates generally failed to identify and then give a detailed description of the available secondary sources of water supply associated with sprinkler systems. As sprinkler questions are common within the section of the Intermediate examination, candidates must make the effort to thoroughly understand the subject.

Management and Administration

This was a disappointing section within this year's examination because, with the exception of a few who achieved excellent pass marks, the section posed many problems to candidates.

Particular reference to the above point is question 18 that requested candidates using a suitable diagram to explain the meaning of the term 'chain of command'. Candidates failed to demonstrate through their answers an adequate depth of knowledge of this subject, and many therefore unfortunately failed to achieve adequate marks for a pass. Management and administration features throughout the existing range of examinations, and candidates must therefore continue their studies to improve their chances of future success.

2004 IFE Examination Details

The Rules, Regulations and Syllabuses, together with examination application forms can be downloaded from the IFE website at www.ife.org.uk

TIMETABLE

Membership Examination

Thursday March 11th 2004

- am** Paper 1 (Fire Engineering Science)
- pm** Paper 4 (Building Construction)
- Paper 6 (Fire Service Operations)
- Paper 7 (Aero Fire Studies)
- Paper 8 (Fire Investigation)
- Paper 9 (Marine Fire Studies)
- Paper 10 (Petrochemical Fire Studies)
- Paper 11 (Civil Emergency and Disaster Management)
- Paper 12 (Communications)

Friday March 12th 2004

- am** Paper 5 (Human Resource Management)
- pm** Paper 2 (Fire Safety)

Note:- Papers 1, 2 & 5 are compulsory papers for those taking the examinations under the current regulations and require one optional paper. It is not necessary to sit four papers in the same year. Individual papers may be attempted. All papers being taken should be entered on the application form, ensuring that the subject paper and paper number agree and are clearly indicated. Candidates are expected to answer six questions from eight on all papers which are each of three hours duration.

Graduate Examination

Thursday March 11th 2004

- am** Paper 1 (Fire Safety);
- pm** Paper 2a (Operations)
- Paper 2b (Control & Communication)*
- Paper 2c (Aero Fire Studies)*

Friday March 12th 2004

- am** Paper 3 (Fire Engineering Science)
- pm** Paper 4 (Human Resource Management)

Candidates are expected to answer six questions from ten on all papers which are each of three hours duration.

It is not necessary to sit all four papers in the same year. Individual papers may be attempted but passes in all four sections are required to obtain the Graduateship Certificate.

UK candidates who pass either paper 2b or 2c together with papers 1, 3 & 4 will **NOT** be entitled to claim reciprocity with the statutory Station

Officers' Exams. To claim under the reciprocal arrangements, candidates should ensure that both parts of the Sub Officers exams have been passed prior to completing the Graduateship examination, and must pass Papers 1, 2a, 3 & 4.

Intermediate and Preliminary Examinations

Thursday March 11th 2004

- am** Preliminary
- Intermediate Paper 1
- pm** Intermediate Paper 2

EXAMINATION FEES 2004

The examination fees for 2004 are as follows:

Preliminary / Intermediate	£30
Graduateship / Membership.....	£30 per paper*
(*where all four papers are taken in the same year the fee will be reduced to £100)	

The closing date for the receipt of applications from candidates outside the UK is October 31st, 2003, and November 30th, 2003 for the UK and Republic of Ireland candidates.

It is incumbent upon all Branch Secretaries and individuals to ensure that applications, together with a remittance of the correct fees, are sent well in advance of the closing dates mentioned above. This is particularly important for candidates residing outside of the United Kingdom in countries where exchange control operates and official approval is required for the remittance of funds.

Candidates are reminded that they must be current members of the Institution in the appropriate grade, that is to say, they must have renewed their membership for the membership year 2003 when applying, also the subscription due 1st January 2004 must have been received prior to sitting the examinations.

Applications received after the closing dates mentioned above will NOT be accepted.

Application forms must be fully completed and legible to avoid errors and delay. Preferred examination centres should be stated although it may not always be possible to comply with a request.

The Rules, Regulations, Syllabuses for the Examinations, together with the examination application forms can be downloaded from the IFE website at www.ife.org.uk

Candidates should ensure that they are acquainted with the Examination Rules, Regulations and Syllabus