

Institution of Fire Engineers Examinations 2010.

Examination Committee's Report on IFE Examinations held in March 2010.

This report on the IFE's examinations held in March 2010 was compiled by the Institution's Chief Examiner Mr Michael Quay, based upon individual reports submitted by the members of the Examinations Committee.

As the Institution's Chief Examiner I am pleased to present the report for the IFE's International Examinations which were held in March 2010. The report has been compiled by the IFE's Senior Examiners who collated reports submitted by the individual subject specialists in their teams.

This year saw another increase in the number of candidates registering for the Institution's examinations and in the number of papers taken. New examination centres were established in Tanzania, Egypt and the United Kingdom, where an increasing number of UK fire and rescue services made use of the Institution's examinations service.

I would like to thank all candidates for taking part in this year's examinations and to commend them for their initiative and professionalism in seeking to develop their knowledge and understanding of fire engineering and related studies. I know the Examinations Committee would like to congratulate all the many candidates who achieved success in IFE exams this year. The committee also wishes to commiserate with those who did not progress as they hoped and wants to encourage them to aim for success in 2011 and beyond.

Candidates for IFE Examinations in 2011 may like to bear in mind the following points:-

1. **Every examination answer is considered on its merits.** Although examiners prepare a series of projected answers to the examination questions they set, these mark schemes do not preclude credit being awarded for other accurate, relevant knowledge and comment given by candidates. Indeed, the standardisation exercise at the beginning of the assessment period includes a critical look at the mark schemes in the light of additional legitimate responses accepted after marking a representative sample of scripts.
2. The **Study Skills** document supplied by the IFE has been revised and amended for 2011. In particular, the sections on assessment objectives and their associated trigger (or command) words have been amended. (To download this document on the IFE website, please use the following hyperlink:- http://www.ife.org.uk/docs/Study_Skills.doc.) This document gives advice on the methods by which candidates can prepare for their examinations.
3. Several areas of the **IFE Examination Syllabus** have also been revised for 2011. These revisions can be found in the following areas:-
 - Level 3 Certificate: Management and Administration.
 - Level 3 Diploma: Paper 2a International Operations.
 - Level 3 Diploma: Paper 5 UK Operations.
 - Level 4 Certificate: Paper 6 Fire Service Operations.

- Level 4 Certificate: Paper 11 Civil Emergency and Disaster Management.

Candidates should ensure they study from the current 2011 version of the syllabus rather than from copies they may have downloaded previously.

4. As in previous years, candidates lost marks in the examinations of 2010 in one or more of the following ways:-

- **Lack of preparation.** A number of candidates wrote several answers that gained pass marks, but as they had not covered the whole syllabus thoroughly enough, the rest of their answers did not reach the same standard and consequently their final mark fell short of a pass. It was also clear that many candidates relied upon their own experience in writing their answers rather than revise from the recommended texts in the reading list.
- **Lack of relevance.** Many candidates wrote a good deal of information on a particular topic without **applying** this information **to the wording of the question**. (For example, they may have written a **list of bare facts** when the question asked them to **discuss the merits and disadvantages** of a course of action.) Candidates should ensure the information they write down is relevant as well as accurate, and that their knowledge is applied in the way that the phrasing of the question demands.
- **Lack of planning.** It is important for candidates to organise their thoughts and structure their answers **before** writing essays in an examination. Even a brief plan can provide some systematic method and structure to help achieve this.
- **Poor time management.** Candidates should divide the time available for the examination evenly among the questions they attempt so that each one can be answered carefully and thoroughly. Every year many candidates complete two or three good answers at length and gain high marks for them. Unfortunately this leaves insufficient time for the remaining answers which can be spoiled by careless errors, or they are written very briefly without the detailed information necessary to secure a pass.

At the end of another busy year it remains my privilege to thank all examiners (whether new this year or well-established,) for continuing to develop and enhance the IFE's examinations service by applying their expertise and energies generously and tirelessly on behalf of the Institution's candidates.

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Chief Examiner, the Institution of Fire Engineers,

Level 4 Certificate Examinations.

Paper 1: Fire Engineering Science.

Question 1.

A pump supplies 4kW of energy to the water flowing through a 45mm hose. The water flows 15m vertically and through a 25mm branch at a rate of 500 litres per minute.

*Using **Bernoulli's equation**, calculate the pressure at the branch.*

(20 marks)

Successful candidates were able to calculate with accurate figures in all parts of the question, whilst unsuccessful candidates used incorrect figures and failed to demonstrate that they understood how to use the Bernoulli Equation. Candidates should be more accurate in the figures they use in their calculations. It is advised that all Fire Engineering Science candidates carry out a variety of calculations involving Bernoulli's Equation so that they are able to apply it comfortably.

Question 2.

A welding transformer gives a current of 300 Amps. The secondary winding (through which the 300 Amps flow) has a resistance of 0.1 Ohm. The transformer is on for 50 seconds and off for 10 seconds continuously. The transformer is made of 10 kg of iron and 8 kg of copper surrounded by 15 kg of oil.

***Calculate** as a percentage the amount of heat the transformer must lose through dissipation if the rise in temperature after one hour of operation is not to exceed 30°C.*

(Assume that the oil, the copper and the iron are all at the same temperature.)

<i>Specific heat capacity (SHC) of iron</i>	<i>=</i>	<i>480 J/kg°C</i>
<i>Specific heat capacity (SHC) of copper</i>	<i>=</i>	<i>385 J/kg°C</i>
<i>Specific heat capacity (SHC) of oil</i>	<i>=</i>	<i>3360 J/kg°C</i>

(20 marks)

Those candidates who were successful in this question were able to calculate the heat generated by the transformer, together with the heat of the iron, copper and oil. Those who were unsuccessful were unable to calculate either of the above, and made mathematical errors leading to an incorrect answer. Candidates should practise from previous exam papers where questions of a similar nature are used.

Question 3.

a) ***Explain** why a flame is unable to pass through narrow gaps, **defining** in your answer the term **quenching distance**.*

(12 marks)

b) ***Show** how this is used in the design of:*

- i. Flame arrestors
- ii. Flameproof electrical equipment

(8 marks)

Successful candidates were required to demonstrate that they had studied the relevant subject matter, as this question tested the basic knowledge of fire engineering. However too many candidates had little or no knowledge of the subject matter and made vague and unambiguous statements that are not good enough at this level of examination. Unsuccessful candidates had little knowledge of quenching distance, flame arrestors or flameproof electrical equipment. Knowledge about this topic is important as this is significant subject matter for practising fire engineers.

Question 4.

A steel container of Mercury has a total volume of 0.8 litres and is 75% full. Initially it is at a temperature of 15°C and the air above the mercury is at a pressure of 1 bar. The container and its contents are heated to 265°C.

- a) **Calculate** the following:-
 - i. The new volume of the container. (6 marks)
 - ii. The new volume of the mercury. (6 marks)
 - iii. The pressure of the air in the container. (6 marks)
- b) **Identify and explain one important factor** that has been omitted in the above calculation. (2 marks)

N.B.

Coefficient of linear expansion of steel: 11×10^{-6} per °C

Coefficient of cubical expansion of mercury: 18×10^{-6} per °C

Successful candidates in general answered question a (i) and a (ii) well and included an attempt at a (iii).

Unsuccessful candidates made no attempt at a (iii). Nearly all candidates showed a poor understanding of part b) of the question.

Question 5.

- a) **Explain** what is meant by **infra red radiation**. (4 marks)
- b) **Describe an infra red radiation detector** (not a beam detector) and **explain** its principle of operation. (8 marks)

- c) **Suggest** appropriate locations where this type of detector should be employed, giving reasons for your answer.

(8 marks)

Successful candidates gained good marks by explaining their understanding of infra-red wavelength and frequency. They also showed good understanding of the main components of an infra-red detector. In contrast, unsuccessful candidates had no idea of what infra-red radiation was or enough knowledge of the components in the detector. A surprising number of candidates did not understand the risks this detector was best suited to cover. Candidates should learn not only the technical details of fire detectors, they should also have a good understanding of the criteria determining their appropriate location. They should also demonstrate an in-depth understanding of the scientific principles underlying this question. Regrettably too few were able to do so on this occasion.

Question 6.

Two adjacent pressurised containers are connected through a manifold and the contents of both are being drawn off at a constant rate. The pressure gauge on Cylinder A reduces with time but the pressure gauge on Cylinder B remains constant.

- a) *From this observation, **what conclusions** can you draw about the nature of the contents of the cylinders?*

(10 marks)

- b) **Explain** your conclusions, quoting any scientific laws or principles identified.

(10 marks)

Successful candidates were able to draw conclusions from the information supplied, and as a whole demonstrated a good knowledge of all the Gas Laws. In the better answers, candidates were able to identify and explain the laws. Those who were unsuccessful did not draw enough conclusions from, or demonstrated no understanding of, the laws. They may have mentioned Boyle's Law, Charles' Law and the general laws, but they failed to state what they meant. Those that were unable to identify that one cylinder contained a true gas whilst the other contained LPG failed to achieve a pass mark. To gain good marks on part a) candidates had to draw a number of conclusions from the information provided and justify their conclusions with an example. For part b) candidates had to name the Gas Laws (e.g. Boyle's Law) and explain what each law meant.

Question 7.

"Progress in fire detection technologies has been substantial over the last decade. This has been brought about by advances in sensor, microelectronics and information technologies, as well as a greater understanding of fire physics."

Discuss the ways in which these advances have contributed to the development of **fire detection technologies** during the last ten years.

(20 marks)

Successful candidates had read widely on this subject and discussed most of the relevant points covered by this question. Unsuccessful candidates mentioned the technical details of old and well known types of fire detectors. (Some candidates even mentioned sprinkler systems.) This question required candidates to think deeply about the subject and relate to the state of art technology in this subject matter.

Candidates should read the technical articles in the Fire Risk Management Journal as useful sources of information in preparing for examinations.

Question 8.

*Discuss the **scientific process** of providing **intumescent coatings** for the protection of steel structures in buildings.*

(20 marks)

Those candidates who provided enough detailed information about intumescent coatings gained enough marks to secure a pass in this question.

In contrast, those who were unsuccessful often discussed building construction using steel structures in general terms, together with an explanation of how steel reacts in fire. The question however focused on the provision of intumescent protective coatings to steel structures.

Paper 2: Fire Safety.

Question 1.

*The first stage in fire engineering design is to establish the basic parameters of the project. This can be described as the **qualitative design review (QDR)**.*

a) ***Describe** the remaining stages in a **qualitative design review**.*

(15 marks)

b) *In larger projects, the **qualitative design review** is carried out by a study team. Who should be included in a QDR team?*

(5 marks)

Candidates who were successful in this question showed that they had studied relevant material and the bibliography. Many candidates who attempted the question were clearly relying on their own experience and had not studied the recommended texts. While they were able to make an educated guess in answering part b) they failed to do very well in part a) which carried the majority of the marks for this question.

Question 2.

*You have been asked to give advice on the development of a fire safety solution for a large hotel complex. The owner is concerned about **business continuity** as well as **life safety**.*

*Discuss a range of possible solutions, **demonstrating** how they address the owner's areas of concern.*

(20 marks)

Few candidates were successful in answering this question and those who attracted most marks were able to offer a range of different options. Expected responses included isolating areas of higher fire risk, using intelligent fire alarm systems, sprinkler systems and smoke control systems as well as different evacuation strategies. Many candidates relied on giving very basic fire safety advice and did not consider that a large hotel complex is likely to comprise more than just sleeping accommodation and a restaurant. A number of candidates interpreted business continuity as meaning the disruption caused by installing a fire alarm or sprinklers rather than the measures put in place that lessen the impact of a fire and allow the business to carry on trading after an incident.

Question 3.

*Two **occupant protection strategies** are used to protect residents in apartment blocks in the event of fire. **Evacuation** is one strategy and **stay put** (sometimes known as **defend in place**) is the other.*

a) ***Identify** the fire safety measures required for **evacuation** and **explain** how they facilitate the process of moving residents out of the apartment block.*

(5 marks)

b) ***Discuss** the key principles of the term **stay put** (or **defend-in-place**) and **explain** the fire safety measures required for this strategy to be effective.*

(5 marks)

c) ***Discuss** the relative advantages and disadvantages of these two **occupant protection strategies**.*

(10 marks)

A large number of candidates understood the difference between the two strategies and submitted reasonable answers, which secured them a pass mark for this question. For operational candidates this should have been a straightforward question as they regularly have to deal with both types of strategies. The lack of understanding revealed in many of the answers is worrying. Candidates failed to explain the need for a protected route required for evacuation from a building as well as the degree of compartmentation needed for staying put. Having demonstrated such a lack of basic understanding, these candidates naturally struggled to discuss the pros and cons of the two strategies.

Question 4.

A residential children's home is planning to host a film crew making a documentary. Filming will take place over an extended period and may occur at any hour of the day or night.

a) ***Describe** the additional **fire safety hazards** this situation will create.*

(12 marks)

- b) **Detail the risk appropriate fire safety remedies** which should be employed to ensure the safety of all occupants, including the children.
(8 marks)

This question was set to see how candidates could apply their fire safety knowledge to a 'real-world' situation. Successful students did this by recognising the hazards the situation presented and suggesting solutions to them. They scored highly by concentrating on the situation described in the question and NOT by relying on general fire safety advice. In contrast, unsuccessful candidates did not consider the scenario and just gave basic fire safety advice. Others did not answer directly the questions asked, (some even talking about showing films in a cinema,) and others highlighted the danger from cellulose film which is generally no longer in use.

Question 5.

- a) **Describe** the fire safety measures found in multi-storey hospitals.
(10 marks)
- b) **Outline** the issues which need to be covered in a staff training programme for hospital staff.
(10 marks)

Candidates who scored highly in answering this question recognised some of the specific fire safety requirements for hospitals and demonstrated that they had researched this area. They also concentrated on training measures specific to hospital staff such as the movement of high dependency patients. Candidates who gave general fire safety advice and covered staff training that was not specific to hospitals attracted few marks.

Question 6.

Smoke and heat ventilation systems (SHEVS) are used in many large modern buildings.

- a) **Name** the two main types of **SHEVS**.
(2 marks)
- b) **Discuss** the general design principles of **SHEVS** relevant to their application in a retail shopping complex or shopping mall.
(18 marks)

Successful candidates had studied this area and they submitted detailed and accurate answers. As this was a technical question, answers that included a clear diagram to help explain the answer were awarded higher marks. A number of candidates had a limited knowledge of this area and while they often understood the purpose of SHEVS they did not understand how smoke could travel around a building.

Question 7.

You have been asked to undertake a fire risk assessment on a construction site where timber framed buildings are being erected.

- a) **Draw up** a comprehensive list of topics that should be covered by fire safety measures specific to sites where timber framed buildings are under construction.

(18 marks)

- b) When timber framed buildings are being constructed, what is the **primary aim** when making fire safety arrangements in the event of fire?

(2 marks)

Some very good answers were submitted in response to this question. Successful candidates stressed the need for tight management control and they also understood the more specific requirements based on the hazards relating to timber. Some candidates relied on very basic fire safety advice, and while some mentioned hot works, very few recognised the dangers from drilling and cutting.

Question 8.

- a) **Firefighting shafts.**

- i. In which types of buildings should firefighting shafts be provided?

(3 marks)

- ii. Where should firefighting shafts be located?

(2 marks)

- iii. Provide an annotated diagram of a firefighting shaft at ground level.

(5 marks)

- b) **Firefighting lobbies.**

- i. What is the purpose of a firefighting lobby?

(3 marks)

- ii. What hazard is a firefighting lobby designed to eliminate?

(2 marks)

- iii. Provide an annotated drawing of a firefighting lobby at accommodation level.

(5 marks)

A large number of candidates were able to answer this question successfully and provided the clear diagrams required. In general, those who had studied the relevant material were awarded high marks. The number of candidates who did not know where a firefighting shaft should be located was disappointing. Many diagrams were unclear and a common error was to draw the outlet for a firefighting lobby in the wrong place.

Paper 5: Strategic Human Resource Management.

Question 1.

- a) **Explain** the purpose of a **selection interview**. (5 marks)
- b) **Describe** what is meant by the term **competency based interview**. (6 marks)
- c) **Explain** the advantages of interviews as a method of selection. (5 marks)
- d) **Explain** the disadvantages of interviews as a method of selection. (4 marks)

Highly marked answers demonstrated that the purpose of an interview is to assess candidates for a job or promotion. They also recognised that competency based interviews assess particular skills and they discussed the relative merits and demerits of interviews as a method of selection. Poorly marked answers often saw the selection interview as constituting the whole of the selection process. They demonstrated no real understanding of what was meant by a competency based interview. These answers often saw the interview solely from the candidate's point of view and failed to recognise that factors such as the skill or the bias of interviewers could affect their judgement. Some candidates also failed to realise that interviews are not an appropriate method for assessing some types of competency.

Question 2.

*All organisations should have human resources policies. **Discuss** the main points that should be included in an overall policy statement **and** the concepts and values that should be embedded in human resources policies.* (20 marks)

Successful candidates gained high marks for recognising that an overall HR policy statement is a strategic document and that it is very much concerned with identifying and promoting the values of the organisation. Unsuccessful candidates often wandered off the point and wrote at great length about individual aspects of a particular HR policy.

Question 3.

***Explain** the purpose and process of **personal development planning**.* (20 marks)

Candidates who did well with this question understood that personal development planning was very much the responsibility of individuals, although they could expect help from their line managers. They also clearly identified the stages involved in preparing a PDP. Candidates who did poorly in their answer to this question tended to confuse PDP with staff appraisal and this cost them marks.

Question 4.

Explain the reasons why organisations should take account of **occupational stress** and **describe** how it can be managed.

(20 marks)

Candidates receiving high marks for their answers clearly identified that organisations should take account of occupational stress, because they have a responsibility to provide a safe working environment. If staff performance is adversely affected by this environment it affects the overall operation of the organisation. They also recognised that there are a number of ways in which occupational stress can be managed. Candidates with low marks for this question concentrated more on the first part of the question, neglecting to describe the management of occupational stress.

Question 5.

a) *What actions can managers take to prevent tensions developing within their teams?*

(12 marks)

b) *In the event of tensions developing, in what ways can managers work to resolve them?*

(8 marks)

Successful answers to this question clearly identified how managers could prevent tensions developing and that prevention involves the use of “hard” and “soft” skills. These answers also demonstrated how tensions that have developed can be resolved. Unsuccessful answers concentrated on too narrow a range of prevention strategies and saw resolution as mainly in terms of the manager mediating between the “warring factions”.

Question 6.

a) **Explain** how managers can use **formal performance appraisal** to help achieve team and organisational objectives.

(13 marks)

b) **Describe** the factors that are important in carrying out effective formal performance appraisals.

(7 marks)

Candidates who identified how performance appraisals can be used to achieve team and organisational objectives were awarded good marks for their answers to this question. They also understood that the combination of “hard” and “soft” skills was necessary in using performance appraisals to achieve these objectives and that the way in which appraisals are carried out influences the effectiveness of the process. Other candidates however failed to identify enough ways in which performance appraisals can be used. In the main they concentrated on the “hard” skills used and did not give adequate consideration to illustrating how effective performance appraisals are achieved.

Question 7.

***Explain** how leaders can ensure that major changes are successfully introduced to an organisation and embedded within it.
(20 marks)*

High scoring answers demonstrated that this question focused on a range of leadership skills, both “hard” and “soft”, as pre-requisites to making major changes. On the other hand, low scoring answers concentrated purely on the “hard” skills, thus describing a limited range of leadership skills.

Question 8.

***Identify** the actions managers can take to develop the effectiveness of their teams and to ensure that they contribute to the achievement of organisational objectives.*

(20 marks)

Successful candidates identified the importance of the following factors:-

- Combining “soft” skills (such as communicating, motivating and delegating,) with “hard” planning skills.
- A suitable management style.
- Team building and loyalty within the team among the members of it.

Unsuccessful candidates tended to concentrate purely on **SMART** targets and ignored the human and motivational element.

Paper 6: Fire Service Operations.

Question 1.

*You are a member of a fire service project group tasked with developing a **command and control system** for use at incidents.*

***Discuss** the requirements of the system you are developing:-*

- You should include **descriptions** of the roles of the key officers.*
- Explain** how the system will **interface with the command systems** of other emergency services.*

(20 marks)

This was a very popular question, with many candidates gaining high marks, although most that attempted it achieved a marginal pass. Successful candidates gained marks by giving detailed descriptions of the key roles and by showing how other services’ systems relate to the fire and rescue service’s command systems. High scoring candidates went on to explain the **relationship** between the key roles.

Candidates who scored low marks in their answers to this question omitted relevant information and wrote in generalised terms. Many listed the officers’ titles and included no detail about their roles.

Question 2.

You have been tasked with writing a **memorandum of understanding** for the responding emergency services with regard to incidents on high speed roads consisting of two multi-lane carriageways.

- a) **Detail** the responsibilities of each service to include the following:-
- i. The overall command structure.
 - ii. The positioning of fire appliances and other vehicles.
- (14 marks)
- b) **Explain** the measures you would adopt to ensure that oncoming traffic avoid the incident.
- (6 marks)

In their answers successful candidates appreciated the contributory role of each service and showed how command of the incident could move from one service to another. They also included accurate clear diagrams to illustrate how the appliances should be positioned.

Unsuccessful candidates often did not use diagrams and gave one-line answers that lacked detail when describing the responsibilities of each service.

Question 3.

- a) **Describe** the systems available for identifying dangerous substances in transit by road, particularly those in bulk.
- (8 marks)
- b) **Discuss** the relative effectiveness of each of these systems.
- (12 marks)

High marks were achieved by candidates who understood the different systems and used diagrams to illustrate the placards. They compared the workings of the different systems and appreciated that each had advantages and disadvantages. Unsuccessful candidates showed poor knowledge of the various systems and tended to make bland unsupported statements when discussing the relative effectiveness of different systems.

Question 4.

- a) **Define** the term **backdraught** and **explain** the causes of this phenomenon.
- (6 marks)
- b) **Describe** the signs and symptoms of a backdraught.
- (6 marks)
- c) What actions should be taken by firefighters in relation to the following:-
- i. Methods of entry?
 - ii. Extinguishment of fires?
 - iii. Prevention of backdraught?
- (8 marks)

High marks went to those candidates who gave detailed definitions of backdraughts and gave comprehensive explanations of their causes. These candidates knew the signs and symptoms of backdraughts and explained compartment entry procedures clearly. High marks also went to those who appreciated alternative tactics used to overcome the causes of backdraughts. As this was generally a well-answered question, there were comparatively few poor answers, although those that attracted low marks did so because the incorrect door entry procedure was specified and few signs or symptoms of backdraught were detailed.

Question 5.

You are called to a fire on a train in a railway tunnel that passes under the sea. In addition to the twin main tracks running through the tunnel there is a smaller service tunnel. The train involved has a mixture of commercial and private vehicles as well as the passengers from those vehicles.

- a) *What are your **operational considerations**?* (10 marks)
- b) ***Describe** the facilities you would expect to have been built into the tunnel to protect life and aid firefighting and rescue.* (10 marks)

Successful candidates explained why the operational considerations were of importance and described fully the facilities that were desirable. However, many candidates were awarded low marks for this question because they wrote narrative lists for both part a) and part b). Although they gained some marks, writing simple lists of actions is not good enough at this level and candidates need to demonstrate a strategic grasp of topics. Several candidates did not read the question correctly and assumed the scenario was specifically the Channel Tunnel throughout their answers.

Question 6.

Climatic change is increasingly associated with exceptionally heavy rainfall, occurring in a short timescale, often leading to extensive flooding of urban areas which do not normally experience such events.

- a) ***Discuss** the hazards and risks associated with working in flooded areas. As the officer in charge, how would you ensure the safety of your firefighters?* (13 marks)
- b) *What are the **strategic considerations** that should be taken into account when planning for and dealing with this type of incident?* (7 marks)

Candidates with a good grasp of this question provided developed answers covering the hazards and risks of extensive urban flooding. Although they showed some appreciation of the strategic issues for the fire and rescue service, few understood the wider community issues involved and their implications for fire and rescue services. Less successful candidates submitted lists of actions rather than explained strategic considerations and many did not recognise the welfare needs of rescuers.

It is worrying that several candidates recommended tying a line to firefighters working in water as the sole device to secure their safety.

Question 7.

You are the officer in charge at a large fire at an industrial site in an urban area for the production of commercial chemicals.

a) **Explain** the inter-relationship among the following:-

- i. Operational tactics.
- ii. Technical support.
- iii. Logistics.

(12 marks)

b) Further considerations:-

- i. **Describe** the potential environmental impact resulting from this incident.
- ii. **Explain** the control measures you would adopt to minimise the environmental consequences of this fire.

(8 marks)

Successful candidates defined each of the three areas listed in part a) and explained in detail how each affected the others. They also included the main types of pollution arising from this incident.

Although many less successful candidates explained what they would do at an incident involving commercial chemicals, they included few details to explain how they would minimise the environmental consequences of this type of fire.

Question 8.

You are called to a substantial fire on a cargo vessel alongside in a major port.

Discuss the design features, **including** the fire protection measures, which will assist or hinder you in developing your firefighting strategy.

(20 marks)

This question was poorly answered in general. Very few candidates scored more than the minimum pass mark but those who did gave adequate explanations to show why the various design features were important and how they would assist or hinder firefighting.

Unfortunately most candidates who attempted this question fared badly. In the main they gave lists of general fire safety features and focused on training for the crew (which was not part of the question,) rather than discussing the design features and fire protection measures.

Paper 7: Aero Fire Studies.

Question 1.

a) *During the initial stages of an aircraft accident, the officer in charge carries out an initial risk assessment. **Explain** the elements that are involved in this process.*

(11 marks)

b) *As the incident closes what are the **three** main activities that the officer in charge must consider?*

(9 marks)

Successful candidates recognised that:

a) The officer in charge should:-

- evaluate the situation;
- gather information;
- assess the resources available for tasks;
- select safe systems of work;
- assess the chosen systems of work;
- introduce additional control measures; the use of other safety equipment; additional PPE;
- the use of BA;
- the use of safety officers;
- re-assess systems of work and additional control measures.

b) The officer in charge should also consider:

- Maintaining control; continual risk assessment, protective and preventative measures.
- The welfare of crews.
- Incident de-briefing.

Marks were also allocated for candidates who included the following:-

Defuelling; preservation of evidence; statements from eye witnesses; the preservation of official documents and personal effects; the re-establishment of airport category as soon as practicable; the recovery of flight recorders. Those who were unsuccessful mainly failed to answer part a) in sufficient detail. A large number of candidates restricted their answers to the process of risk assessment and spent a great deal of time detailing each element of the process rather than concentrating on the **initial** stages of the incident. Part b) was generally well answered.

Question 2.

Evaluate the communication needs and options for an airport rescue and firefighting service.

(20 marks)

For candidates to be successful in answering this question they would need to raise the following points,

- AFS appliances must have contact with AFS watch room and ATC, via UHF and VHF.
- AFS appliances must have contact with each other.

- Mobile radio telephone handsets; mobile phones; the requirement for alternatives and a backup.
- Contact by headphone between driver and monitor operator (if applicable).
- Knowledge of the phonetic alphabet.
- Radio equipment must be tested at the start of each watch rotation.
- Radio equipment should be secured and fixed to the appliance (unless it is the portable handset).
- All radios used must provide two way communications.
- The ability to have direct contact with captain of the aircraft (usually on discreet channel 121.6).
- All radios must have the appropriate range to ensure good reception.

There were a lot of good responses to this question. However, many candidates spent a lot of time describing the generic needs of good communication rather than restricting their responses to the specific needs of airport rescue and firefighting services.

Question 3.

Which factors must be considered when detailing a specification for an airport rescue and fire-fighting vehicle?

(20 marks)

Candidates that were successful in this question recognised the following:

Preliminary considerations - Compatibility of a new appliance with the existing fleet; Role of new appliance; Capacities relating to present and future airport RFF category; Quantitative advantages of adopting new extinguishing agents; Dimensional loading limitations imposed by airport features and local terrain.

Preparation of a specification - Quantities and types of extinguishing agent, output requirements, discharge patterns and replenishment facilities; Crew cab capacity, design & safety aspects, instrumentation accessibility for operations, ease of driving and operating simplicity; Equipment range and stowage, needs for special equipment; Automotive performance-minimum acceptance criteria; Access for preventative maintenance and support protective treatments and finishes.

Additional contractual considerations - Provision of an adequate technical manual; initial commissioning programme at airport; provision of training for fire service and support personnel; in-service support by contractor's technical staff; supply of fast moving spare parts with new vehicle; prompt supply of spare parts when required.

In general, this was a well answered question with some candidates achieving full marks. Candidates who failed to achieve success in this question appeared to rely on local knowledge rather than study the reading list and bibliography.

Question 4.

a) *Discuss the main challenges for the **fire safety design** of new airport terminals.*

(10 marks)

b) *Compare and contrast the fire safety facilities of modern airport terminal buildings with the existing provision for fire safety in traditional airport terminals.*

(10 marks)

Successful candidates included the following in their answers,

In part a) :-

- New fire safety concepts “cabin” + “island”;
- More use of fire safety engineering solutions to solve fire issues; cost Effective new construction methods;
- New architectural designs leading to large open spaces;
- Achieving business continuity in the event of fire;
- New fire regulations for terminal buildings.

In part b):-

- Extended travel distances;
- More emphasis on fire prevention measures, especially for structural stability;
- More use of integrated fire risk management;
- An effective means of escape and evacuation strategy;
- More consideration now for airport security, fire alarms, sprinklers, CCTV, security access;
- Smoke flow & ventilation systems;
- Human behaviour is now taken into account when considering fire safety issues.

Candidates who had studied the syllabus properly provided some very good scripts. However, in general, this question was not well answered, with most candidates, failing to demonstrate sufficient knowledge in the fire safety design of airport terminals or the options available to provide fire safety facilities.

Question 5.

*Discuss the planning for **future resource** needs of an airport rescue and firefighting service.*

(20 marks)

Success for candidates in this question was gained by recognising that as the airport grows and develops so must the fire service.

- By using new appliances with dual application and booms/high reach capability.
- Increase in personnel, possible restructure of existing crews.
- Equipment to meet new demands, media (extinguishing agents) PPE.
- Premises and the possibility of new sub stations to meet response times.
- Faster appliances, bigger appliances more media carried, monitors with greater reach and throw.
- Training of staff to meet new demands of new aircraft type.
- Finance.
- Liaison.
- Interoperability with local authority for new category of aircraft.
- New techniques for search and rescue on new aircraft & internal fire fighting.
- Look at new tactics for the new aircraft as positioning & rescue could be severely hampered.

In general this question was answered well.

Question 6.

a) *What are the three classifications into which internal fires on board aircraft can be categorised?*

(9 marks)

b) *Discuss the strategies for fighting fires within the **hidden areas** of an aircraft fuselage.*

(11 marks)

Candidates who gained success in part a) of this question recognised that the three categories are:

- Fires occurring whilst on the ramp/airside areas.
- Fires occurring whilst in the air (in-flight).
- Fires occurring after a crash.

Success in part b) was obtained by stating the following points:

- Use FLIR.
- Use hand held infra red imaging equipment.
- Extreme care when removing panels.
- Good searching techniques using the back of the hand to locate heat sources.
- Get information charts/access from engineers, aircraft manufacturers, other professional bodies.
- Demonstrate understanding of the meaning of hidden areas as cargo bays, underneath the floor, above the ceiling, tunnel areas, behind the cabin sidewalls, ductwork, air conditioning units.

In general this was not a well answered question. The majority of candidates wrongly identified fires that can occur **externally** to the aircraft rather than the internal fires specified in the question. When answering part b) very few candidates demonstrated an understanding of what was meant by **hidden areas** and some spent time discussing fighting fires in confined spaces and the use of halon extinguishers rather than the actual strategies required.

Question 7.

***Explain** the different types of radiation risk normally found at airports and aerodromes as well as the hazards they present to firefighters.*

(20 marks)

Successful candidates were able to include the following information within their answer:-

- Most types of radiation at airports are for medical use and security scanners may use some forms.
- The common types of radio isotopes for medical use are, Iodine (I-125), iridium (Ir-192) & caesium 137 (Cs-137).
- They are usually found in small quantities on passenger aircraft: 1 kg -100 kg or (1 litre -60 litres) and on Cargo aircraft: 15 kg – 200 kg (1 litre – 220 litre).
- Radioactive materials with flammable or pyrophoric properties are not permitted.
- Lengthy exposure to radioactive material occurs because it is not known that the material was on board.
- Some types of radar can emit harmful radiation.

- If fire fighters have open wounds, radioactive materials may enter the body and bloodstream easily.
- Remove fire-fighters with open wounds from the contaminated area.
- Leaking packages, packages may be damaged by fire.
- Passengers carrying material onboard (cabin area) without permission.
- If radiation is known at incident, keep numbers low and use dosimeters.
- Radioactive substances can be spread over large areas and concealed in wreckage.
- It is essential after the incident that decontamination procedures of equipment and personnel are carried out.

In general, this was a well answered question, candidates who failed to this question tended to spend a great deal of time describing the different types of radiation when the question specifically asked for explanations of the types of radiation normally found at airports and aerodromes.

Question 8.

*Discuss the dangers associated with **composite materials** found on civil aircraft.*

(20 marks)

Candidates successful in this question understood that composite materials can be found virtually anywhere on the aircraft, especially military. They can be toxic and can present respiratory risks: they can be a carrier of infection or they can be very sharp. They may create a danger area and may be spread over a large distance due to winds and the explosion of the aircraft.

- Conductivity – highly conductive may damage electrical equipment.
- Difficult to cut.
- May release gases when burning due to the resins used to bind them.
- Structural strength of composite material when fire damaged will be reduced, rescuers should be aware of possible floor panels, unsafe etc.
- Consideration of wearing of BA, consideration of safety of other rescue personnel, rescue personnel kept to a minimum.
- Use of foam to reduce airborne particles.
- Decontamination of rescue personnel may need to be considered.

Most candidates who attempted this question were awarded good marks.

Paper 8: Fire Investigation.

Question 1.

a) ***Explain in detail** the operation of two circuit protection devices commonly found on domestic electrical consumer units.*

(10 marks)

b) ***Give one example** of an electrical fault that may lead to a fire in domestic premises and **explain** why the circuit protection fitted in the consumer unit would not prevent it.*

(10 marks)

Successful candidates recognised that a high level of detail and explanation was required in order to answer this question well. They also demonstrated a good understanding of circuit protection. Less successful candidates often failed to understand the difference between fixed main wiring and appliances. Consequently their answers lacked substance.

Question 2.

- a) **List** the equipment that you consider should be included in an **evidence collection kit** used for investigating fires.

(4 marks)

- b) **Describe** the correct procedure for documenting and packaging a sample from a fire scene believed to be contaminated with an ignitable liquid residue.

(10 marks)

- c) Other than traces of an **ignitable liquid residue**, what **other relevant evidence** may be found on clothing seized from an arson suspect?

(6 marks)

This was a popular question and generally answered very well by the candidates who attempted it. Those that did less well mistook what was required of them in answering part b), where procedures should be written in a series of sequential steps.

Question 3.

Discarded cigarettes are often depicted by the film industry as an ignition source for a pool of petrol or gasoline.

Discuss the likelihood that a discarded cigarette end can act as an ignition source for petrol (or gasoline) vapour.

(20 marks)

There were very few good answers to this question on the whole. However, some candidates did achieve good results by focusing on the wording of the question and discussed the likelihood of ignition in this way across a range of scenarios. Few candidates concentrated on the characteristics of a cigarette as opposed to the behaviour of petrol vapour.

Question 4.

- a) **Describe** the three **modes of heat transfer** commonly associated with fire.

(12 marks)

- b) **Discuss the effect** of each of these modes of heat transfer with regards to the development and growth of a compartment fire.

(8 marks)

High scoring answers to this question provided detailed accounts of the methods and mechanisms involved in the modes of heat transfer and their effect on the development of a compartment fire. Candidates who scored low marks for this question simply named the modes of transfer, giving little detail and no explanation or discussion of their effects.

Question 5.

*Those first in attendance at a fire scene can provide valuable information for the fire investigator. In particular, fire crews that are **trained to observe** will possess information that will contribute to the investigation.*

a) ***List** six questions that could be asked by the investigator of first response teams whose answers would be of value to the investigation.*
(6 marks)

b) *In relation to the **determination of origin**, the scientific method should be applied to ensure a systematic approach. In relation to the collection of data, **list and describe** the various available sources and their value to the investigator.*
(14 marks)

Although some candidates wrote reasonable answers without apparently having read the bibliography, it was evident from the answers of those that had what a difference studying the set texts makes to a candidate's performance in an examination. Part b) caused problems for some candidates: they misinterpreted the meaning of that section of the question.

Question 6.

*The behaviour of ignitable fluids in a fire follows certain physical rules which investigators must appreciate if they are to detect such **accelerated fires**.*

***List** these rules and **briefly describe** how each may affect the behaviour of a fire.*
(20 marks)

Very few candidates submitted good answers to this question. Those that did achieve success did so by demonstrating a good level of knowledge and understanding of the behaviour of ignitable fluids. Unfortunately a number of candidates did not answer the question directly, and digressed from the focus of it. It seems that these candidates were keen to write what they knew rather than keep to the question itself.

Question 7.

a) ***List** eight reasons why an investigator would excavate a fire scene.*
(8 marks)

b) ***Describe briefly** the steps involved when approaching the excavation of a fire scene.*
(12 marks)

Successful candidates had clearly read the appropriate texts and were able to reproduce much of the required information therein to good effect. It was clear that a number of candidates chose this question as a last resort and they made some wild guesses at the answer rather than demonstrating the appropriate knowledge and understanding required.

Question 8.

- a) *The victims of fatal fires are occasionally found with their upper limbs in the **pugilistic pose**.*

***Explain** this phenomenon and its causes.*

(8 marks)

- b) *Whenever human or suspected human remains are discovered at a fire scene, an investigator must consider a number of questions in relation to the remains.*

***List** these questions and **briefly describe** the importance of each one to an investigation.*

(12 marks)

The candidates who attempted this question were either very successful in it or they did very badly indeed; there seemed to be no middle range of marks. Those who did well answered the question directly with an excellent level of detail and a good understanding of the physiology involved. These candidates also read carefully part b) and answered it directly.

The poorer answers revealed no understanding at all of what is meant by the “pugilistic pose” and they were not able to list the questions an investigator must consider or describe the importance of each one to an investigation.

Paper 11: Civil Emergency and Disaster Management.

As in previous years, this was still a minority choice of examination paper in 2010, yet this year it was taken by a larger number of candidates. Yielding approximately 30 scripts, it still represents a small and perhaps unrepresentative sample of candidates and it is not possible to generalise about the standard of the answers or about the questions candidates found straightforward or difficult. As in 2009, the quality of the scripts submitted this year showed a significant disparity between candidates who excelled at the paper, scoring high marks and achieving very good grades and those who struggled to achieve a pass at all. The questions are reproduced below:-

Question 1.

- a) ***Explain** what is meant by an **integrated approach** to emergency management.*

(10 marks)

- b) ***Discuss** the practical considerations associated with this strategy.*

(10 marks)

Question 2.

The successful management of any major incident involves a number of core aspects.

***Discuss** these core aspects in relation to a **contingency plan** involving a combined response to a major civil disaster.*

(20 marks)

Question 3.

*Most major incidents can be considered to have **four stages**.*

a) ***Describe** the four stages of major incidents.*

(12 marks)

b) *With the aid of a diagram, show their relationship on a **response / time graph**.*

(8 marks)

Question 4.

a) ***Detail** the immediate needs of the media in the early stages of civil disasters.*

(10 marks)

b) *How would you manage the requirements of the media in the early stages of a civil disaster?*

(10 marks)

Question 5.

*Emergency response and recovery arrangements should be flexible and tailored to reflect circumstances, but they will follow a common set of **underpinning principles**.*

*There are **eight** underpinning principles: **outline** each one of them.*

(20 marks)

Question 6.

Voluntary organisations can make a useful contribution during major incidents.

a) ***Name** the types of voluntary organisations that may contribute.*

- b) **Describe** the types of support activities that each voluntary organisation can offer.

(20 marks)

Question 7.

- a) Explain the term **post traumatic stress disorder (PTSD)**. (5 marks)
- b) Who may be affected by it? (5 marks)
- c) What are the causes and symptoms of PTSD? (10 marks)
-

Question 8.

Acts of terrorism that result in relatively high numbers of casualties and damage to property present significant challenges for rescue services.

- a) **Outline the factors** that should be taken into consideration when conducting a risk assessment for acts of terrorism during the **planning phase**. (10 marks)
- b) Give an **explanation** of each of the above factors. (10 marks)
-

Level 3 Diploma Examinations.

Paper 1: Fire Safety.

Question 1.

Insulated **sandwich panels** are used in various types of modern buildings such as food preparation areas and cold storage.

Outline the best practice that reduces the fire risks associated with the use of insulated sandwich panels in buildings.

(20 marks)

This was not a popular question among candidates. Many of those who attempted it took a maintenance approach to the risks associated with sandwich panels and followed the guidance given in the relevant bibliography. Less successful candidates showed little evidence of studying the bibliography and tended to rely on their own operational experience as the basis for an answer. Although this gained them some marks, usually it was not enough to secure a pass grade for this question.

Question 2.

The **horizontal method** is an appropriate means of evacuation for some types of premises.

a) **Give two examples** of premises where this method of evacuation is used.

(2 marks)

b) **Explain** the principle on which this type of evacuation is based.

(4 marks)

c) **Identify the building design features** that ensure horizontal evacuation will be effective.

(14 marks)

This question was generally well answered, particularly by those who had evidently studied the recommended texts, although some candidates' answers revealed that they were quoting from their own experience too much. Unfortunately some candidates confused the principles of progressive horizontal evacuation with phased evacuation.

Question 3.

List and discuss points for consideration with regard to the siting of portable fire extinguishers.

(20 marks)

This was a popular question which on the whole attracted good marks for those candidates who attempted it. Although most candidates understood that this was a question about the criteria determining the **siting** of extinguishers, others misread the question and described the different **types** of extinguisher, their operation and the classes of fire for which they were used. This was largely irrelevant and the digression cost them marks.

Question 4.

Describe the factors that cause smoke movement within a building.

(20 marks)

Successful candidates clearly understood the broader aspects of the physical movement of smoke within a building, referring to "mushrooming" and the "stack effect". Less successful candidates in contrast often discussed compartments and buildings themselves rather than the movement of smoke. Many of these candidates' scripts failed to mention "mushrooming" or the "stack effect" and lost marks by neglecting to include significant factors in their answers.

Question 5.

a) **Outline** the four phases of a **standard** ventilated fire curve.

(8 marks)

- b) **Give** a typical temperature range at ceiling height for a **domestic fire compartment**.
(2 marks)
- c) **State briefly** how a **fire growth curve** is used for standard testing.
(2 marks)
- d) **What** are the two main functions of fire doors?
(4 marks)
- e) **What** are the qualities that make up **fire resistance**?
(4 marks)

Although only a minority of candidates who attempted this question achieved high marks, those that did clearly demonstrated the range of knowledge and understanding of fire and its effects that was required by the question. Some candidates included well drawn and fully annotated diagrams which also helped them gain good marks. Poorer answers often omitted parts a), c) and e), thus depriving candidates of a realistic chance of achieving a pass mark for this question. Poorly executed and incorrect diagrams compounded the weakness of some answers.

Question 6.

- a) **Define** the following terms:-
i. *Compartment.*
ii. *Final exit.*
iii. *Place of safety*
iv. *Protected stairway.*
v. *Travel distance.*
(10 marks)
- b) **Discuss** the term **significant findings** in relation to fire risk assessment.
(10 marks)

This question was generally well answered by candidates, many of whom achieved high marks. They found the task of defining and discussing the required terms a relatively straightforward exercise. Less successful candidates tended to stray from the point of part b) and focused their answers upon risk assessment principles on the fireground.

Question 7.

Portal frame construction buildings are used throughout the world in a variety of industries.

By the use of simple annotated sketches, **identify and describe** the behaviour of **portal frames** in fire **and relate this** to the sequence of collapse.

(20 marks)

This question generated few successful answers, but those candidates who had studied the recommended bibliography scored high marks. Most candidates who attempted this question submitted disappointing answers with poor diagrams and inadequate explanations. Beyond the evident lack of study, the reason for this is not clear: perhaps candidates chose this question as a last resort; perhaps they underestimated the amount of detailed explanation required.

Question 8.

a) **Describe** the role of the **fire warden**. (10 marks)

b) **Outline** the training necessary to fulfil the role of **fire warden**. (10 marks)

This was a “bread and butter” question for a student of fire safety and it proved very popular with candidates, many of whom achieved high marks. Those who were less successful in their answers often misunderstood the role of the warden and explained the role of “responsible person” instead.

Question 9.

a) **List and explain** the factors that should be taken into account when locating smoke detectors in buildings. (10 marks)

b) **Discuss** the particular problems associated with the positioning of smoke detectors within residential buildings. (10 marks)

Many candidates answering this question concentrated on the principles of operation of smoke detectors and included some elaborate diagrams. Unfortunately this style of answer attracted few or no marks as the focus of the question was concerned with siting and positioning. Part b) was generally answered poorly and so candidates struggled to reach a pass mark for this question.

Question 10.

a) **Define** the term **disabled refuge**. (4 marks)

b) **Explain how** disabled refuges are used within buildings. (6 marks)

c) **Describe** the **design features** you would expect to find in a disabled refuge. (10 marks)

This was a question attempted by many candidates. It was generally well answered with accurate definitions and detailed descriptions by UK and overseas candidates alike. Less successful candidates tended to have misunderstood the question and

assumed the responsibility to evacuate disabled persons lay with the fire and rescue services.

Paper 2a: Operations.

Question 1.

*As the officer in charge of the first attending appliances you are called to a large open plan warehouse (**portal frame construction**) with signs of a developing fire.*

- i **Outline** your initial actions.*
- ii. **Discuss** the factors you would consider in relation to risks and tactics.
(20 marks)*

Candidates who correctly identified that the steel structure would become unstable in a developed fire and explained why achieved reasonable marks. If they then went on to outline a risk assessed process to deal with the incident and possible further risks, weighing up tactics against benefits they achieved really good marks. Candidates with good operational knowledge were generally successful in answering this question. In contrast those who were unsuccessful generally used lists and bullet points with no depth of discussion. Some also ignored the fabric of the building as an issue.

Question 2.

With regard to a fire pumping appliance:-

- a) With the aid of **annotated diagrams**, **describe** the operation of a fire pump.
(10 marks)
- b) **List and explain** the factors that may prevent lifting from open water.
(10 marks)

Successful candidates had read the relevant fire service manuals and correctly detailed the main features and operation of the centrifugal fire pump. They also correctly indentified several factors that can prevent pumping from open water. Most candidates were able to score well on this part of the question with some excellent diagrams provided. There were a number of candidates who submitted detailed drawings of a full fire appliance: unfortunately this attracted no marks. Those candidates who provided a list of factors with no explanations missed out on scoring good marks for that section.

Question 3.

- a) With regard to high voltage overhead power cables, **discuss** the risks present in the **hazard area**.
(10 marks)

- b) As the officer in charge, **what precautions** would you take to ensure the safety of your crews?

(10 marks)

This was a popular question, and successful candidates linked the properties of smoke and water together with a number of conductors of high voltage electricity in the answers they submitted. It was clear that the better answers showed evidence of studying the recommended bibliography. Less successful candidates wrote in general terms and cited the danger of electrocution which in itself did not gain them high marks. Curiously, few candidates proposed safe operating distances.

Question 4.

As the **officer in charge** of an incident you have particular responsibilities and duties.

- a) **Describe** the key elements of the role of the officer in charge at incidents.

(10 marks)

- b) In relation to incident command, **explain** the terms **Gold, Silver and Bronze**.

(10 marks)

Many candidates who attempted this question gained high marks for their answers. Generally they answered part b) better than part a) and explained the terms *Gold, Silver* and *Bronze* accurately and in detail. Many answers to part a) were couched in vague and general terms and lost marks accordingly. Unfortunately some candidates did not understand the concepts of *Gold, Silver* and *Bronze*, and could not differentiate between *Strategic, Tactical* and *Operational*, which reduced their chances of a high mark for this question.

Question 5.

When responding to **civil aircraft incidents off airport**, **discuss** the risks and appropriate actions that an officer in charge should consider to ensure the following:-

- i. *Effective operations.*

(12 marks)

- ii. *The safety of the crews.*

(8 marks)

This was not a popular question and it was not answered particularly well. Those candidates who were successful in this question identified the risks to crews from the aviation fuel and from man made mineral fibres (or MMMF's). Those candidates who applied common sense in articulating operational tactics also scored high marks. Many unsuccessful candidates confused this with an on-airport incident, and did not discuss the likelihood that the crash scene may also be a crime scene for further investigation. Others who attempted this question gave little indication that they had covered the subject matter at all.

Question 6.

You are the officer in charge at a **road traffic collision (RTC)** involving a chemical tanker and another vehicle with a trapped casualty at the scene. There is no fire but there is product leaking from the tanker.

- a) **Outline** the sources of information you can access on scene to assist tactical planning. (5 marks)
- b) **Discuss** the actions you would take to resolve the situation. (15 marks)

Successful candidates provided clear annotated diagrams along with a good discussion about the actions taken to resolve the situation. The best answers discussed the options and weighed up tactics in relation to perceived risks in rescuing the casualty. Those who were unsuccessful clearly had no grasp of the systems and their use by fire service personnel who were responding to this type of incident. Some candidates did not discuss the casualty or even how to tackle the incident, wherein lay the majority of the allocated marks.

Question 7.

A merchant container ship is berthed **alongside** in harbour. There is a fire in the engine room, with persons missing. The ship's systems are not available. You are the officer in charge of the first attendance.

- a) **Explain** the actions you would take in this situation. (10 marks)
- b) **Detail** the information that should be available to you. (10 marks)

Candidates who identified that a ship should have a fire wallet containing a number of information sources, and who used this information to frame their answers were successful in this question. In contrast, those candidates who did not fare as well did not understand that the question was asking for the ships wallet. Some however covered part a) quite well but lacked the insight to answer part b) in any detail.

Question 8.

As the officer in charge of two appliances you are called to an incident where sewer workers have reported that an underground team is not responding.

- a) **Explain** the risks to your firefighters from working in a confined space and in raw sewage. (5 marks)
- b) **What actions** should be taken by the officer in charge on arrival at this incident? (10 marks)

- c) **Detail** the actions you would take to safeguard the welfare of your firefighters after the incident had been concluded. (5 marks)

This question attracted many good answers, with successful candidates gaining their marks mostly to parts a) and b). In identifying the risks, the better answers appreciated the need for follow up monitoring of the crews involved. However many candidates were unable to develop a coherent structured tactical plan and therefore did not achieve high marks in part b). In addition some candidates did not identify welfare issues relating to health risks (such as not eating or drinking until decontaminated) and others even omitted the need to decontaminate the crews and their equipment.

Question 9.

With the use of an **annotated diagram**, describe the operation of a typical **compressed air breathing apparatus demand valve**. (20 marks)

Some excellent diagrams depicting several types of demand valve were produced in answer to this question, all of which attracted high marks. Some candidates also achieved success by providing accurate detailed labels to their diagrams. Those who included diagrams of breathing apparatus without detailed labels or without showing any understanding of how the demand valve operated were not awarded many marks.

Question 10.

Wildland fires in remote areas create logistical problems for fire services.

- a) **Compare** and **discuss** the options available for supplying water to tackle **scrubland fires**. (12 marks)
- b) When dealing with a developed **forest fire**, **describe** the following:-
- i. Fire spread.
 - ii. Measures to protect the safety of firefighters.
- (8 marks)

Successful candidates discussed their answers as the question requested. Others wrote in bullet points and so denied themselves the opportunity to score as highly. Many candidates showed they understood the topic well, and quoted good examples in describing ground spread and tree top fire spread. Those who included a number of considerations in the form of a list did less well, but did gain some marks for making relevant points. Some candidates did not convey knowledge of the potential for rapid fire spread.

Paper 2c: Aero Fire Studies.

Question 1.

*Explain the factors that should be taken into account when considering the provision of additional water supplies at **licensed aerodromes**?*

(20 marks)

The majority of candidates answered this well with some innovative ideas which attracted marks. Candidates who relied on a hydrant system and building an airport near a river did not score many points.

Question 2.

a) *Explain the objectives of an **Aerodrome Emergency Plan**.*

(9 marks)

b) *List the organisations which should be represented on the **Aerodrome's Emergency Planning Committee**.*

(11 marks)

This was a relatively straightforward question which produced some good answers to part a) which were often let down by poor lists in part b). The marks allocated are shown on the question and a list of two organisations in part b) would not be awarded high marks.

Question 3.

a) *Explain when the **RFFS (Rescue and Fire-fighting Service)** shall be provided at **licensed aerodromes**.*

(6 marks)

b) *Illustrate by means of a chart how the **Aerodrome Categories** are defined.*

(7 marks)

c) *Illustrate by means of a chart how **Heliport Fire Fighting Categories** are defined.*

(7 marks)

This question was generally well answered with the majority of candidates achieving good scores in parts b) and c). Part a) was less well answered with a number of candidates going into long winded answers which tended to go off track.

Question 4.

a) *List the minimum number of RFFS foam producing vehicles required for each of the **aerodrome categories 3 – 10**.*

(8 marks)

b) *Detail the requirements for **complementary extinguishing agents** at licensed aerodromes.*

(6 marks)

c) *Detail the requirements for the **reserve supply of extinguishing agents** that shall be available at licensed aerodromes.*

(6 marks)

This was a very well answered question with the majority of candidates displaying good levels of knowledge producing the concise answers required for maximum marks.

Question 5.

- a) **List** the subjects that should be included in RFFS structured training programmes for both **initial** and **continuation training**.

(11 marks)

- b) In relation to **training and development**, **define** the following terms:

- i. *Assessment*
- ii. *Debrief*
- iii. *Performance Criteria*

(9 marks)

Answers to part a) seemed to pose a problem to a number of candidates, but this should have been a relatively straightforward question for those who had studied. Part b) was generally well answered with the majority achieving high marks.

Question 6.

- Describe and explain** the fire-fighting and rescue procedures that should be adopted at incidents involving freight aircraft.

(20 marks)

This question was not particularly well answered, with a number of candidates appearing to describe passenger aircraft procedures and then adding something about freight. Those achieving higher marks included the types of aircraft used, (cargo, combi-aircraft etc.) and details of different types of cargo and the particular hazards such as radiation, animals etc.

Question 7.

- Describe** the hazards that may be encountered by RFFS personnel when dealing with a helicopter incident.

(20 marks)

Most candidates attempting this question achieved good marks. The majority displaying good levels of knowledge and understanding to what should be relatively straightforward to those studying. A number of poor scripts again showed a lack of preparation.

Question 8.

- Detail** the general **apron (or ramp) safety management measures** to be adopted during the fuelling and de-fuelling of aircraft with passengers on board.

(20 marks)

Candidates achieving high marks in answering this question showed good in-depth knowledge and well-structured answers.

Question 9.

Discuss the potential problems for the RFFS when attending incidents involving the new generation of large body passenger aircraft such as the A380.

(20 marks)

For a question about new aircraft which has had much worldwide publicity, answers were extremely poor. There is a wealth of information available and candidates must read around the subject. Very few candidates achieved good scores and displayed a worrying lack of knowledge about today's technology.

Question 10.

a) At incidents involving **civil aircraft**, **list and describe** the hazardous substances which may result in RFFS personnel becoming contaminated.

(12 marks)

b) With the aid of an **annotated diagram**, **describe** and **illustrate** a basic decontamination procedure to be applied in the circumstances described above.

(8 marks)

Generally part a) was well answered: however, part b) polarised answers with about half producing good well laid out diagrams and the remainder producing very poor illustrations which attracted few if any marks.

Paper 3: Fire Engineering Science.

Question 1.

a) **Define** the term **coefficient of linear expansion**.

(4 marks)

b) **Write down the formula and calculate the increase in length** of a steel beam 17.5m in length under the following conditions:

i. The temperature of the steel has risen from 18^oC to 63^oC.

ii. The coefficient of linear expansion of steel is 0.000012.

(12 marks)

c) **What features** are incorporated into the following to allow for expansion?

i. Bridges.

ii. Railway lines.

iii. Buildings.

(4 marks)

Successful candidates generally answered this question well by proving their understanding of calculation methods amongst other requirements. They also demonstrated to good effect the practical applications of the principles of linear expansion. Those that defined in detail the term *coefficient of linear expansion* gained close to full marks. Unsuccessful candidates generally did not complete the calculation accurately, and lost marks for not quoting the formula.

Question 2.

- a) In relation to radiation, **define** the following terms:
- i) Half life
 - ii) Radioactive decay
 - iii) Isotope
 - iv) Thermal radiation
- (8 marks)
- b) **Describe two** types of radioactive particles.
- (6 marks)
- c) **List the THREE** ways in which personnel can be protected from the effects of radiation and **give an example** of each.
- (6 marks)

Those who were successful in this question possessed a good understanding of the subject and were able to demonstrate their knowledge within the terms of the question. They also demonstrated a good overall knowledge of radiation, giving full descriptions in their answer to part b), and provided the examples requested. Those who were unsuccessful were often unable to define the terms accurately in part a). Also too many candidates failed to give examples in part c), and considered gamma radiation to be a particle. It was clear they could not give the definitions and failed to use the key technical wording.

Question 3.

Write down the chemical formulae and **list** the properties and significant hazards of the following substances:

- a) Nitrogen (5 marks)
- b) Ammonia (5 marks)
- c) Chlorine (5 marks)
- d) Hydrogen sulphide (5 marks)

To be successful in this question, candidates needed to demonstrate an understanding of the properties and hazards associated with the substances listed. Nitrogen is an inorganic material, and those who recognised that generally scored high marks. Unsuccessful candidates quoted incorrect formulae, (or did not know the formulae), and were also not aware of the properties and hazards of each of the substances. In some cases, candidates listed similar properties for all the materials.

Question 4.

a) **Define** the following terms:

- i. *Critical temperature.* (2 marks)
- ii. *Critical pressure.* (2 marks)
- iii. *Sublimation.* (2 marks)
- iv. *True gas.* (2 marks)

b)

- i. **Define** the term **BLEVE**.
- ii. **Explain** how a **BLEVE** takes place.

(12 marks)

Successful candidates needed to answer both parts of the question in order to demonstrate they understood the relationship between the temperature and the pressure of both gases and liquids. They were also required to understand the term *BLEVE* and its associated factors, and how a *BLEVE* occurs. Those who were unsuccessful did not know the definitions in part a): they gave poor definitions and were clearly confused about what causes *BLEVE*s. They had little understanding of the mechanism of a *BLEVE*, with some candidates describing “boilovers” instead.

Question 5.

a) A storage tank of water measures 20m x 10m and has a uniformly sloping bottom along its length from 7m to 5m in depth. The tank is full to 1m below capacity.

How much water is in the tank? (Express your answer in litres.)

(6 marks)

b) It is proposed to decant the contents into a circular tank of 20m diameter which has a maximum depth of 2m.

What is the capacity of the circular tank and how many circular tanks of this size will be needed?

(8 marks)

c) The transfer is to be completed using 4 x 25mm nozzles operating at 4 bars pressure.

How long will the transfer take?

(6 marks)

Successful candidates recognised the formula to be used, and attempted the question well, demonstrating good applied mathematics and accurate calculations. Unsuccessful candidates used only parts of the formulae and misplaced decimal points. This showed they failed to check their calculations. Generally, the answers to part c) were either omitted or poorly answered.

Question 6.

a) **Explain** the difference between **scalar** and **vector** measurement. (4 marks)

b) **Define** the following terms:-

- i. Speed
- ii. Velocity.
- iii. Acceleration.
- iv. Momentum.
- v. Force.

(10 marks)

c) **List the equations** for the following terms:-

- i. Acceleration.
- ii. Momentum.
- iii. Force.

(6 marks)

Good descriptions of scalar and vector differences led to reasonable marks for this question, but to be really successful, candidates were also required to show a good understanding of the definitions in part b). Many recognised that *scalar* was magnitude only, and that *vector* also had direction. Accurate definitions were required together with accurate formulae and equations. Less successful candidates generally gave poor definitions and could not explain the difference between scalar and vector. They rarely defined all the terms in part c) and *momentum* and *force* were defined the least of all. Generally they did not list the equations and showed poor overall knowledge of the subject.

Question 7.

*A lifting bridge is 15 metres in length and spans a river. It has failed in the down position and needs raising. There are two **vertical point loads**. The first weighs 400kg and is 5m from the pivot point: the second weighs 700kg and is 8m from the pivot point.*

a) **Draw a diagram** to illustrate the applied forces. (6 marks)

b) **What jacking force is required** at the end further away from the pivot point if the section of bridge weighs 100 kg/m? (14 marks)

N.B. Ignore any **friction resistance** that could result from the motor at the pivot point.

Easy marks were gained by successful candidates for good diagrams which demonstrated their level of understanding. An accurate diagram which identified the applied forces usually indicated a well constructed answer overall. Successful candidates were also able to determine the formula in the question. In contrast unsuccessful candidates were not able to complete the calculations, and lost marks for confusing *force* with *mass*.

Question 8.

A High Volume Pump is 80% efficient and is driven by an engine of 115 kW brake power.

- a) **What water power** is the High Volume Pump capable of developing?
(4 marks)
- b) When 7000 litres of water per minute are being taken from the pump, **what is the pressure** in bar at which the pump is operating?
(6 marks)
- c) The High Volume Pump is delivering 7000 litres per minute through 2 lines of 150mm hose of 10 lengths each terminating in a monitor of identical nozzle size.
What nozzle size will be required at each monitor to deliver this quantity of water?

N.B. Assume friction losses in each line are 0.2 bar per length and the monitors are 10 metres above the water level. Take the pressure value as calculated in part b).

(10 marks)

The pass mark on this question was achieved by candidates who successfully applied basic calculations correctly, and by those who were confident enough to tackle part c). Unsuccessful candidates often did not read the question properly, they failed to apply their knowledge of the formula, or they omitted to answer part c). A surprising number of candidates were unable to calculate a percentage, and were also unsure how to transpose formulae.

Question 9.

With reference to electrical safety devices:

- a) **State** where and why a **miniature circuit breaker (MCB)** is used within an electrical installation.
(4 marks)
- b) **Explain** the operating principles of a **MCB**.
(4 marks)
- c) Within an electrical installation **state** where and why a **residual current device (RCD)** is used.
(4 marks)
- d) **Explain** the operating principles of a **RCD**.
(4 marks)
- e) **Outline** the main functional difference between the two devices.
(4 marks)

Successful candidates recognised the fundamental point that RCDs protect people, and that MCBs protect electrical equipment. Knowledge and understanding of electrical installations, the differences between the two devices, and the use of them were the keys to answering the question. Unsuccessful candidates lacked the knowledge of the operation and use of RCD's and MCB's, and they showed little understanding of the difference in function between the two devices.

Question 10.

Benzene is a hydrocarbon that has common uses as a constituent in rubbers, lubricants and dyes.

- a) Benzene's chemical formula is C_6H_6 .
- Draw a simple diagram** to illustrate the chemical structure of benzene.
 - What are the two major **hydrocarbon classifications**? To which one does benzene belong?
- (10 marks)
- b)
- Detail a balanced chemical equation** for the combustion of Benzene (C_6H_6) in air.
 - Explain** the meaning of the phrase **stoichiometric conditions** in relation to the above chemical equation.
- (10 marks)

Good presentations of the ring structure and aliphatic and aromatic compounds gained high marks. Candidates who were successful in this question also provided an accurate equation, and showed their understanding of the chemical structure of Benzene. On the other hand, unsuccessful candidates lacked real knowledge of hydrocarbons, and often did not attempt to balance the equation. Also no knowledge of the Benzene ring structure led to detailed descriptions of alkane structures, candidates also showed that they were not aware of the phrase *stoichiometric*.

Paper 4: Human Resource Management - International.

Question 1.

Explain what employers can do to help employees who are suffering from work-related stress.

(20 marks)

Successful candidates defined stress and identified a range of strategies that could be used by employers. These included job change, autonomy, improving physical working conditions, realistic tasks, training, counselling, flexible hours and a workplace free of bullying and harassment. Less successful candidates concentrated on fewer of the above; for example, counselling or improving physical working conditions, or providing a supportive family-friendly atmosphere.

Question 2.

The concept of **principle-centred leadership** was identified by Stephen Covey.

- a) **Outline** the four **correct principles** with which Covey believes principle-centred leaders should align their values.
- (4 marks)
- b) **Describe** the eight **characteristics** which Covey claims principle-centred leaders possess.
- (16 marks)

This was a question that required detailed knowledge of a specific management style. Successful candidates knew and understood the four principles and the eight characteristics and they were able to mobilise this knowledge to their advantage. Candidates who did not possess this detailed knowledge guessed at the information required. In most cases they guessed incorrectly and were awarded low marks in consequence.

Question 3.

*As money is not believed to be a major source of motivation, **describe** and **explain** the actions managers can take to retain the interest and commitment of their staff.*

(20 marks)

High scoring answers identified a range of ways in which managers could motivate staff. These methods included using “hard skills” (technical and administrative procedures,) and “soft skills” (communication, motivation and problem-solving). Candidates who did not fare well with this question tended to describe the theories of Maslow, Herzberg and McGregor at great length without actually identifying how managers could **use their knowledge** of these theories **to improve** staff motivation.

Question 4.

***Outline** the possible barriers to effective communication between individuals within an organisation.*

(20 marks)

There were some excellent answers to this question, all of them stressing that communication is a two way process. These answers also demonstrated a detailed understanding of the barriers to effective communication.

Less successful candidates lost marks by describing management practices that did not relate to communication at all, or they failed to identify the range of technical and human factors which constituted the barriers.

Question 5.

Organisations should have in place effective performance management arrangements.

a) ***Describe** the purpose of a performance management process.*
(10 marks)

b) ***Explain** the role of first line managers in the performance management process.*
(10 marks)

Successful candidates provided detailed information for both part a) and part b). They fully recognised the purpose of performance management and that it influences the whole of the organisation, not just the human resources. In part b) they

demonstrated a good awareness of how the role of first line managers “fits into” the performance management process as a whole.

Less successful candidates either failed to recognise that this question required different information in each of the two parts, or they wrote at great length about staff appraisal without identifying other aspects of performance management.

Question 6.

a) **Summarise** the key stages that should be included in a **recruitment and selection** process for a large organisation.

(7 marks)

b) **Explain** how the stages you have identified help an organisation to attract and select appropriate staff who are most able to contribute to achieving the organisation’s objectives.

(13 marks)

The better answers to this question succinctly identified the key stages and were able to identify the purpose of each stage in attracting and selecting appropriate staff.

Less successful answers often wrote in great detail about the key stages without actually identifying the purpose they served.

Question 7.

a) **Identify and describe** the behaviours associated with **transformational leaders**.

(7 marks)

b) **Explain** why the behaviours you have identified help staff to accept change.

(13 marks)

Candidates scoring highly with this question not only identified the behaviours of transformational leaders in some detail, they also convincingly linked them to the way in which they can help staff accept and embrace change.

Typically, the less successful answers focused only on part a) and neglected to make the link between the behaviours of transformational leaders and their effect on staff.

Question 8.

Explain the purpose of each stage in a formal disciplinary procedure at work.

(20 marks)

Successful candidates identified the stages and explained the purpose of each of them clearly in terms of demonstrating fairness and resolving performance issues.

Unfortunately a number of candidates lost marks by limiting their answers to descriptions of a disciplinary procedure (albeit in some detail,) but they neglected to explain the purpose of the stages.

Question 9.

a) **Outline** the **principles of confidentiality** which managers should uphold.

(10 marks)

b) **Explain how** managers should adhere to the principles of confidentiality in practice.

(10 marks)

The better answers to this question identified the principles of confidentiality and the practical ways in which they are supported. They also demonstrated an awareness of the importance of a climate of confidentiality in developing and maintaining trust.

Less successful responses tended to identify only a few principles and failed to recognise the practical aspects of maintaining confidentiality.

Question 10.

a) **Identify** the causes of conflict within the workplace.

(7 marks)

b) **Describe** how a manager can deal with conflict between team members.

(13 marks)

Candidates who did well in answering this question identified the many ways in which conflict can be caused as well as the different ways in which a manager can deal with the conflict that has developed.

Lower marks were awarded to those who identified the causes of conflict but were less sure about how a manager could deal with the situation. Candidates submitting answers like this forfeited marks because they failed to enlarge upon the information they supplied in part a) when answering part b).

Paper 5: UK Operations.

Question 1.

The national **USAR programme** has delivered capability in a number of areas of operation.

a) **Detail** the range of equipment and resources available.

(10 marks)

b) **Discuss** how the equipment and resources would be managed. Your answer should include reference to **incident command** and it should differentiate between the following:-

- i. *A major civilian disaster.*
 - ii. *Less serious incidents within your own fire and rescue service.*
- (10 marks)

Many candidates revealed little knowledge of the national USAR programme, showing poor awareness of the involvement of the government and the structure of the programme as a whole. These candidates focused on USAR team structures and local practices. Candidates had to make reference to the following: IRU; DIM; USAR; HVP; ECS.

Those that did not include these terms in their answers lost easy marks. On the whole, candidates failed to show an understanding of the local, regional and national responses within the USAR programme.

Question 2.

*With the use of an **annotated diagram**, **explain** the operation of a typical **compressed air breathing apparatus demand valve**.*

(20 marks)

The response to this question was disappointing and it was clear that most candidates attempting it were relying on their own daily experience rather than a study of the recommended texts. The level of detail required in the diagram was complex and few candidates executed this well.

Other candidates did not attempt the diagram and preferred to rely on written descriptions instead, which was not what the question asked for.

Question 3.

***Describe** the significant hazards and risks associated with incidents involving ice and unstable ground.*

(20 marks)

The key to success with this question lay in reading the question carefully. It focused on risks and hazards, yet many candidates concentrated on operational considerations instead. High scoring answers revealed a study of the recommended texts and covered drowning and hypothermia in detail, although there was little consideration of biological contamination.

Candidates gained no marks for using generic terms such as *slips, trips and falls* and few marks for relying too heavily on their own operational knowledge.

Question 4.

*In relation to **marine incidents**:-*

a) *What does the acronym **SOLAS** stand for?*

(2 marks)

b) ***Describe** in detail what is contained within a SOLAS fire plan.*

(16 marks)

- c) *Where would the SOLAS fire plan be located?*

(2 marks)

This was a specialised question and it attracted few responses from candidates as a whole. A comparatively small number of candidates were successful: those who were had clearly studied the bibliography and had a thorough knowledge of what was contained in the *SOLAS* plan, which was the key to the whole question.

Many candidates who attempted this question had little knowledge of *SOLAS* and so could not realistically achieve a good mark when part b) asked them to describe in detail the contents of the plan.

Question 5.

As the incident commander of the first attendance:-

- a) **Detail** the hazards associated with asbestos.

(8 marks)

- b) **Explain** the actions you would take to mitigate these hazards in order to safeguard your crews, members of the public and the environment.

(12 marks)

This was a popular question with candidates, some of whom gained high marks for detailing amphibole and serpentine asbestos and the hazards associated with each. Part b) generally attracted good marks, although some candidates relied too much on general issues or they focused too much on dealing with an actual incident.

Some candidates (whose knowledge was evidently sufficient to answer the question well,) threw marks away in part b) by *listing* action points rather than *explaining* the basis for them.

Question 6.

As the incident commander of the first attendance you are called to a fire in a historic building containing works of art of national significance.

- a) **Detail** the factors that should be considered in pre-planning.

(8 marks)

- b) **Outline** your tactical considerations.

(12 marks)

Some candidates gained full marks for this question. Their answers demonstrated that their studies had given them a detailed understanding and had allowed them to structure their answers appropriately. In part b) the tactical considerations were generally answered well, although marks were lost by many candidates who neglected to include post-incident considerations in their responses.

However, many less successful candidates relied on their own experience and wrote answers that were too generic in approach, showing little consideration of Analytical Risk Assessment, for example.

Question 7.

With reference to operations involving breathing apparatus (B.A.), consider the following:

- a) **Describe** how breathing apparatus can be rapidly deployed and **explain** how it is used in an **offensive capacity**.
(10 marks)

- b) **Detail** the control measures that should be adopted when using guidelines.
(10 marks)

This was a “bread and butter” question and most candidates attempted it. Unfortunately the majority of them produced poor answers that demonstrated little real understanding and contained a number of “risk critical” statements. Some candidates focused on the operational use of guidelines rather than the control measures to be adopted.

Question 8.

*In the event of a possible **CBRNE** incident involving a suspected chemical attack in a densely populated town centre:-*

- a) **Detail** the equipment and resources needed to detect, investigate and measure possible agents.
(4 marks)

- b) *With the use of an **annotated diagram**, **show** how an initial decontamination facility can be deployed.*
(6 marks)

- c) *Using a fully **annotated diagram**, **show** how a full mass decontamination system can be laid out using national resources.*
(8 marks)

Part a) was generally answered poorly by candidates attempting this question and there appeared to be little detailed knowledge of the resources available for detecting possible agents. On the other hand, parts b) and c) were answered well and candidates generally picked up marks with good diagrams of initial and mass decontamination facilities.

Question 9.

*In relation to incident command, **explain** the following command support functions:-*

- a) *Operations Commander* (5 marks)

- b) *HazMats Officer* (5 marks)
- c) *Sector Commander* (5 marks)
- d) *B.A. Main Control.* (5 marks)

This was evidently the most popular question on the question paper and most candidates answered it well and in detail. Most candidates seemed to rely upon their operational understanding of the command support functions and with this question at least that proved to be sufficient. A small number of candidates were unable to explain the functions in any great detail.

Question 10.

As the incident commander of the first attendance, you are called to an engine room fire on board a commissioned Royal Navy vessel in port.

- a) **Discuss** the actions you would expect RN personnel to have taken prior to your arrival and **explain** what initial information should be gathered by the Incident Commander. (10 marks)
- b) **Discuss** your tactical plan and **outline** the command structure you would employ. (10 marks)

Candidates with a marine background were very comfortable with this question and a number of them earned full marks with their answers. Other candidates who attempted it showed little awareness of the responsibilities of FRS personnel in this situation. They also revealed confusion in their understanding of the tactical plan.

Paper 6: UK Leadership and Management.

Question 1.

Organisations need to manage health and safety if they are to control risks and prevent staff and others from being harmed.

- a) **Describe** the key elements that senior managers should include in their health and safety management arrangements. (12 marks)
- b) **List** the ways in which managers can encourage a positive attitude to health and safety. (8 marks)

Effective answers to this question required a good level of detail focusing on the actions that a manager would take, rather than dwelling on general health and safety information.

Lower marked candidates wasted time by providing details about, for example, health and safety legislation. This type of digression cost candidates marks because it was not relevant and did not relate directly to the question as it was worded.

Question 2.

All fire and rescue services have different levels of staff with different responsibilities.

- a) **Explain** the role of first line supervisors **and how** they contribute to the achievement of organisational objectives.

(10 marks)

- b) **Explain** the role of middle managers **and how** they contribute to the achievement of organisational objectives.

(10 marks)

Successful candidates included more detail on the role of middle managers, as well as good background information on the role of first line supervisors.

Less successful candidates often used the same description for both levels of position. This cost them marks because the question clearly asked for information about different roles within an organisation.

Question 3.

One of the responsibilities of managers is to meet the training and development needs of their staff.

- a) **Outline** the main considerations managers need to take into account when devising a training and development plan for a member of their team.

(14 marks)

- b) **Summarise** the main benefits that training and development plans may have on team culture.

(6 marks)

The better answers to this question included a good understanding that training and development should be considered from an organisational perspective rather than from an individual standpoint.

In contrast, candidates scoring low marks focused exclusively or too much on the needs of the individual. Instead, they should have taken into account the needs of the organisation and its strategic plan, its training policies and the national guidance to which it is subject.

Question 4.

- a) **Describe** what is meant by the terms **corporate knowledge** and **individual knowledge**.

(6 marks)

- b) **Explain** why it is important for organisations to capture and disseminate both types of knowledge.

(14 marks)

Successful candidates identified what was meant by both corporate and individual knowledge and combined this with significant background information in explaining the importance of both organisations in part b).

Unsuccessful candidates often failed to grasp the meaning of the two types of knowledge specified and this made it doubly difficult to attract good marks in part b) when they had to explain the importance of something they did not understand adequately.

Question 5.

a) **Describe** the main features of the following leadership styles.

- i Autocratic
- ii Transactional
- iii Democratic
- iv Transformational

(12 marks)

b) **Identify** a range of situations in which managers would find each style appropriate.

(8 marks)

The best answers to this question demonstrated a very good understanding of the four leadership styles specified and the circumstances under which these styles could be appropriate. Many candidates who scored high marks with this question gave good examples of the styles and the situations.

In contrast, poorer answers confused **transactional** with **democratic** leadership and revealed little understanding of the concept of **transformational** leadership.

Question 6.

If a member of your team is performing poorly, **explain** how you can help that person improve without resorting to **formal disciplinary action**.

(20 marks)

Candidates who attracted high marks with their answers to this question were able to identify the potential causes of poor performance and the actions that could be taken before adopting formal procedures.

On the other hand, candidates receiving low marks often concentrated solely on the causes of poor performance without identifying the ways in which managers could remedy the situation.

Question 7.

Why is the concept of **continuing professional development (CPD)** important to you as a professional?

(20 marks)

Many candidates were easily able to achieve good marks for this question by using the IFE's own definition of CPD which is rooted in the twin concepts of professionalism and a commitment to lifelong learning.

On the other hand some candidates deprived themselves of a good mark by concentrating exclusively or too much on staff appraisal and CPD payments, omitting to explain that professionals have to take responsibility for their own development.

Question 8.

The achievement of organisational objectives may involve co-operation between staff in different departments and external agencies.

Describe the ways in which collaborative arrangements of this kind can be developed and maintained.

(20 marks)

In the main, this question was not answered well by the majority of candidates that attempted it. Those who did well identified in detail the process of how to build co-operation within and between internal departments and external agencies. They also cited some good examples of these arrangements working well in practice.

Unfortunately most candidates focused their answers on a partnership arrangement with which they had had some involvement rather than describing ways in which such arrangements can be made to work.

Question 9.

Explain the ways in which managers can encourage creativity within their teams.

(20 marks)

With this question, successful candidates concentrated on the actions that managers can take to encourage creativity within their teams and identified that mostly, these are rooted in the "soft skills" of communication and motivation, etc.

In contrast, the answers of less successful candidates focused too much on the "hard" processes of performance management and staff appraisal, ignoring the softer skills which are important in developing creativity.

Question 10.

Explain how managers should allocate work and monitor progress to ensure that the performance of their teams contributes to the achievement of organisational objectives.

(20 marks)

The best answers to this question explained in detail the ways in which managers should allocate work and monitor performance in a structured manner and so promote and foster the achievement of organisational objectives.

The poorer answers revealed a failure to identify the range of factors that managers need to take into account and the need for a structured approach.
