Institution of Fire Engineers Examinations 2009.

Examination Committee's Report on IFE Examinations held in March 2009.

This report on the IFE's examinations held in March 2009 was compiled by the Institution's incoming Chief Examiner Mr Michael Quy, based upon individual reports submitted by the members of the Examinations Committee. Mr Quy took up the position in July, succeeding Dr James Marsden who has assumed another portfolio within the Institution.

As the Institution's Chief Examiner I am pleased to present the report for the IFE's International Examinations which were held in March 2009. The report is compiled from contributions submitted by the individual subject specialists who are all members of the Examination Committee.

The previous academic year was a busy and successful one for the Examinations Committee and the officers at IFE headquarters. In October 2008 the QCA gave the IFE awarding body status and in March 2009 Ofqual accredited the IFE's examinations which means they are now nationally recognised qualifications.

This year saw another increase in the number of candidates registering for the Institution's examinations and in the number of papers they took. New examination centres were established in East Africa, India and the United Kingdom.

I would like to thank all candidates for taking part in this year's examinations and commend them for their initiative and professionalism in seeking to develop their knowledge and understanding of fire engineering and related studies.

Traditionally, the purpose of the Chief Examiner's Report is twofold:-

1. To provide a concise yet general summary of candidates' responses to the questions they answered across the range of papers offered.

2. To help prepare future candidates for the Institution's examinations. Although this report does contain some details of examiners' "suggested answers", the information it contains is intended primarily to illustrate the comments being made about the type and quality of the answers submitted by candidates.

Candidates for IFE Examinations in 2010 may like to bear in mind the following points:-

1. Every examination answer is considered on its merits. Although examiners must provide a series of projected answers to the examination questions they set as part of the mark scheme, they do not preclude credit being awarded for other accurate, relevant knowledge and comment given by candidates.

2. The ***Study Skills*** document supplied by the IFE has been revised and amended for 2010. 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. As in previous years, candidates lost marks in the examinations of 2009 in one or more of the following ways:-

    3.1 **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.

    3.2 **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.

    3.3 **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.

    3.4 **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 end up full of careless errors, or written very briefly without the detailed information necessary to secure a pass.

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 2010 and beyond.

It is my privilege at the end of a historic academic year for the Institution to be able to thank all examiners 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,

Membership Examinations.

Paper 1: Fire Engineering Science.

Question 1.

A brake drum has an internal diameter of 300 mm at 15^0C. After a series of braking tests the drum temperature was 70^0C. If the drum has a mass of 4kg and 45% of the heat generated is dissipated to the surrounding air, ***calculate the following****:-*

a) *The maximum internal diameter of the drum.*

(6 marks)

b) *The work done in braking.*

(7 marks)

c) *The braking force if the braking distance was 100 metres.*

(7 marks)

(N.B.
The Specific heat capacity (SHC) of cast iron = 500J/kg/^{0}C.
The coefficient of linear expansion of cast iron = 0.000011/ ^{0}C.)

Most candidates demonstrated a good understanding in answering part a) of the question. Parts b) and c) were not so well answered however, mainly because candidates used the incorrect formula.

Question 2.

A foam generator consists of a tube which tapers from 70mm internal diameter to 20mm internal diameter. 600 litres per minute of water is passing through the generator and the pressure at the input end is 10 bar(s). Using ***Bernouilli's equation****, what is the pressure at the point where the diameter is 20mm?*

*(**N.B.** The generator is horizontal.)*

(20 marks)

Bernouilli's equation was generally well understood by candidates, many of whom submitted good answers which resulted in a number of them achieving very high marks.

Question 3.

a) ***Describe*** *all the factors which allow fires to be detected at a distance.*

(8 marks)

b) ***Discuss*** *which of these factors would be the most useful in detecting the following:-*

i. *A fire in alcohol.*
ii. *A smouldering fire in carbonaceous material.*
iii. *A fire involving the PVC wiring in a computer.*

(12 marks)

Candidates generally had a reasonable knowledge of fire detector factors but very few candidates mentioned ***linear beam detectors*** and ***aspirating*** (air sampling) ***detection systems***.

Question 4.

a) *How does **earthing** (or **grounding**) provide protection to an electric circuit?*
(5 marks)

b) *With the aid of a simple diagram, **explain** what is meant by an **earth fault loop**.*
(5 marks)

c) *Give **TWO** examples of circumstances which would prevent the operation of the protective arrangements within an earth fault loop.*
(10 marks)

Most candidates had a very adequate knowledge of ***earthing*** but did not have a detailed knowledge of an ***earth fault loop*** or the factors that would prevent the protective arrangement operating.

Question 5.

a) ***Define** an **ideal gas** in terms of its pressure, temperature and volume relationship.*
(4 marks)

b) *Does the gas in a cylinder of liquefied petroleum gas behave as an ideal gas? **Explain** the reason for your answer.*
(6 marks)

c) *The cylinder of a compressed air breathing apparatus has a volume of 9 litres. For an average consumption of 40 litres per minute, calculate the pressure at which the warning whistle must be set so that it sounds when the remaining air will last 10 minutes. **Explain** fully any assumptions made.*
(10 marks)

It was pleasing to note that parts a) and b) were answered well, with most candidates achieving full marks. Unfortunately however, part c) was poorly answered because candidates used the incorrect formula.

Question 6.

a) ***Distinguish** between a **premixed flame** and a **diffusion flame**.*
(10 marks)

c) ***Discuss** the progress of a flame through a premix gas/air mixture.*
(10 marks)

This question proved popular with candidates, many of whom answered it well. No major problems or misunderstandings were evident from the answers submitted.

Question 7.

A sealed insulated container has a volume of 0.5m^3 and is full of Nitrogen at 1 bar and 15^{0}C. A 240 Volt supply is applied for 10 minutes to an electrical heating element inside the container with a resistance of 40 Ohms.

*When the current ceases to flow, **calculate** the following:-*

a) *The temperature of the gas.*
(12 marks)

b) *The pressure of the gas.*
(8 marks)

*(**NB:** Any expansion of the container should be ignored.*
The Specific heat capacity of Nitrogen is 1400 J/kg/^{0}C
The density of Nitrogen is 1.3 kg/m^3.)

This was not a favourite question, nor was it attempted successfully on the whole. Candidates generally failed to identify the correct formulae to use and the application of the mathematics was poor.

Question 8.
Describe *in detail the hazards associated with the fire performance of electrical cable.*

(20 marks)

In the main candidates were aware of the ***smoke*** and ***heat factors*** inherent within the question, but they did not have a detailed knowledge of the ***quality issues***.

<u>Paper 2: Fire Safety.</u>

Question 1.

a) ***Detail*** *the properties of a dust that can produce an explosion, giving* ***TWO*** *examples of this type of dust.*

(10 marks)

b) ***Discuss*** *the sequence of events that occur during a dust explosion, and explain the measures that can be implemented to mitigate the risks involved.*

(10 marks)

This proved to be a popular question and candidates often made a good start by scoring highly in part a). In general candidates that attempted this question were awarded high marks for their answers.

Question 2.

a) *Where a plan drawing is used as part of a fire risk assessment:-*
   i. ***Outline*** *the typical reasons for the use of a plan drawing.*
   ii. ***Identify*** *the typical features on the plan drawing.*

(15 marks)

b) *Where premises are multi-occupied or shared, co-operation and co-ordination of the fire risk assessments and significant findings are essential.* ***Outline*** *the main reasons why this is so.*

(5 marks)

Although this question was attempted by many candidates, most of them achieved only average marks because they failed to cover ***risk assessment linkages*** in their answers.

Question 3.
Explain *the meaning and* ***discuss*** *the applications of the following terms:-*

a) *The general* ***principles of risk prevention****.*

(10 marks)

b) *The term* ***fire engineering****.*

(10 marks)

This question attracted the attention of many candidates and it produced some good answers. In part a), the concepts of ***avoiding, evaluating*** and ***correlating risks*** were broadly understood. Candidates could have attracted more marks by making reference to the development of a coherent prevention policy and adapting the work to the individual case.

The second part of the question was less well answered with few candidates mentioning the application of scientific and engineering principles. Even fewer candidates appreciated the importance of ***post fire investigation, analysis, evaluation*** and ***feedback*** which should have been central to any answer.

Question 4.

a) ***Discuss*** *what is meant by the phrase* ***adequate fire safety training****.*

(10 marks)

b) ***Detail*** *the training necessary to fulfil the role of a fire marshal or fire warden.*

(10 marks)

This proved to be a popular question, but with the exception of a few candidates, it attracted only average marks. Candidates answering part a) relied mainly on personal experience rather than the suggested bibliography. Candidates who discussed the meaning of ***adequate fire safety training*** by indicating it should be based on the FRA findings were awarded higher marks than candidates who relied on outlining the actions taken after discovering a fire and raising the alarm. The second part of this question was less well answered and unfortunately some overseas candidates completely misread the question.

Question 5.

Recently there has been a move away from prescriptive ***fire safety regulation*** *to self-regulation based on a* ***risk assessment*** *approach.*

Compare and contrast *the relative merits of the two methods.*

(20 marks)

On the whole, candidates who attempted this question answered it well and produced some very sound answers. It was disappointing to note how many candidates offered ***lists of merits*** when the question asked them to ***compare and contrast*** the ***relative merits*** of the two methods.

Question 6.

Whatever form ***Reaction to Fire Tests*** *and* ***Fire Resistance Tests*** *take, they measure certain basic principles. Give* ***FIVE*** *examples of these principles together with a brief explanation of each.*

(20 marks)

Very few candidates submitted answers to this question that achieved a pass mark. There are numerous different ***Reaction to Fire Tests*** and ***Fire Resistance Tests*** but the question was asking for examples of the basic principles they measure. These were ignitability, ease of extinction, flame spread, heat release, smoke obscuration, test for toxic potency and fire resistance testing. Most candidates concentrated their answer on particular tests they knew about and consequently they were not awarded many marks.

Question 7.
Detail *the facilities you would expect to find in a fire control centre at a large shopping complex.*

(20 marks)

This question was answered well by most candidates who attempted it, although some of them detailed the fire-related facilities found in shopping centres instead of those specifically relating to ***fire control centres***. This meant they spent a long time on the answer only to get a low mark in return.

Question 8.

a) *For what purpose is a radio survey carried out before installing a* ***Radio-based Automatic Fire Detection System****?*

(5 marks)

b) ***Discuss*** *the advantages and disadvantages of this type of system.*

(15 marks)

Many candidates demonstrated a good knowledge of this subject and submitted good answers which achieved a pass. However, most candidates missed out on achieving a high score by just ***listing*** the advantages and disadvantages without ***discussing*** the overall strengths and weaknesses of the system.

Paper 5: Strategic Human Resource Management.

Question 1.
Most managers are responsible for the effectiveness of a group of staff. ***Identify*** *the ways in which team leaders can help their colleagues achieve* ***organisational objectives****.*

(20 marks)

This was a popular question which was generally well answered, with candidates demonstrating a good knowledge of the role of a manager in developing an effective team.

Question 2.
As a manager you have a role in ensuring that an organisation is successful. ***Explain*** *the importance to an organisation of* ***strategic planning****.*

(20 marks)

This question was also generally answered well, with the majority of candidates having a clear understanding of the importance of strategic planning to an organisation.

Question 3.
As a manager you are responsible for ensuring that employees perform effectively.

a) ***Identify*** *the reasons why an employee may be performing poorly.*
(7 marks)

b) ***Describe*** *the actions a manager can take to deal with the situation, other than formal disciplinary measures.*
(13 marks)

This question was attempted by many candidates, most of whom identified conflict in the workplace and personal problems as contributory factors to poor performance by employees. Fewer candidates suggested that if an individual was receiving inadequate support and guidance, that was a possible reason as well. In part b) of the question some candidates lost marks by describing disciplinary procedures when the question clearly asked for measures other than those.

Question 4.

a) ***Explain*** *the ways in which managers can use information to improve organisational performance.*
(8 marks)

b) *What are the factors that need to be taken into account when setting up a system for collecting information and making effective use of it?*
(12 marks)

This was not a popular question and whilst many candidates were able to identify ways in which information is used to improved organisational performance, some were less clear on the factors relating to the setting up of information systems.

Question 5.
Explain *the concept of* ***continuing professional development*** *and its importance to you as an individual.*
(20 marks)

This was generally a well answered question and UK candidates successfully linked the concept of ***continuing professional development*** (CPD) to Integrated Personal Development System (IPDS).

Question 6.
Describe *the procedural items required for a meeting and* ***explain*** *the responsibilities of the chairperson.*
(20 marks)

This question was both popular with candidates and well answered by them. Highest scoring candidates identified the requirement for the chairperson to provide any necessary reports.

Question 7.
"A manager can be flexible in his choice of leadership style in order to be effective."
Discuss *this statement.*
(20 marks)

Many candidates were aware of the meanings and definitions of the different leadership styles but marks were lost when candidates failed to expand on their initial descriptions by discussing the proposition central to the question.

Question 8.

Discuss *in detail the factors that need to be taken into account for a manager to become an effective communicator.*

(20 marks)

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Generally a well answered question however some candidates lost marks by just concentrating on one specific method of communication.

Paper 6: Fire Service Operations.

Question 1.

a) *In relation to civil aircraft incidents off airport,* ***discuss*** *the risks and appropriate actions that officers in charge should consider to ensure effective operations and the safety of their crews.*

(12 marks)

b) ***Discuss*** *actions post incident in relation to working with other agencies, scene preservation and scene safety.*

(8 marks)

This was a difficult question to answer well as the trigger (or command) word in both parts of the question asked candidates to ***discuss*** risks and actions and so required a high level of response from them. The great majority of candidates attempted this question but unfortunately comparatively few of them achieved high marks for their answers.

Question 2.

a*) In relation to petroleum tank fires,* ***discuss*** *the terms* ***boil over*** *and* ***slop over****.*

(10 marks)

b) ***Discuss*** *in detail the actions and considerations to be taken when dealing with a floating roof tank fire.*

(10 marks)

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On the whole, the candidates who answered this question showed a poor knowledge of the subject. Candidates should read questions carefully: part a) asked for more than simple definitions and part b) required a ***detailed*** discussion. Candidates who ignored these requests did not earn themselves high marks.

Question 3.

Discuss *in detail the actions to be taken by the officer in charge when dealing with a fire on board a ship. In your answer you should make particular reference to environmental considerations.*

(20 marks)

Most candidates' answers included very little discussion about environmental issues. Some candidates had studied the sources and produced good answers for this particular problem but others merely stated the general principles that apply to most types of incident.

Question 4.

a) ***Define*** *the terms* ***backdraught*** *and* ***flashover*** *and* ***discuss*** *the signs and symptoms of both conditions.*

(10 marks)

b) ***Discuss*** *gas cooling in relation to fire behaviour,* ***explaining*** *why and how this can affect conditions.*

(10 marks)

This question on fire behaviour was very poorly answered on the whole. Only one candidate was able to define clearly both ***flashover*** and ***backdraught***, and many candidates were unable to discuss gas cooling in any depth. The question demanded a detailed knowledge of chemistry and heat capacity if candidates were to indicate a clear understanding of how water reacts in fire.

Question 5.

Natural disasters occur throughout the world, especially with changes in the climate. ***Outline*** *those safety measures that should be borne in mind to help protect people from the potential threat of fire during (or immediately after) a tornado, typhoon, hurricane or cyclone.*

(20 marks)

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Some candidates discussed compelling reasons to prevent global warming, and these were read with interest despite being largely irrelevant. Most candidates however offered poor answers by focusing on generalities: they failed to link the safety measures and the threat of fire to the scale of the damage caused by natural disasters.

Question 6.

Insulated core panels are used in various types of modern buildings, e.g. food preparation areas and cold storage. ***Outline*** *best practice that can help reduce the fire risks associated with insulated core panels.*

(20 marks)

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Few candidates answered this question. Unfortunately those that did attempt it showed a poor knowledge of the subject and this was reflected in the quality of the answers they submitted.

Question 7.

To manage effectively the risks that crews are exposed to at an incident, it is necessary for the officer in charge to implement a ***dynamic risk assessment*** *regime.*

a) ***Define*** *the term* ***risk assessment****.*

(4 marks)

b) ***Explain*** *the process of* ***dynamic risk management****.*

(16 marks)

Most candidates attempted this question but of these only a comparatively small minority achieved a pass mark. There was also a great disparity between those who answered it successfully: they achieved either Grade A marks (14 or 15) or the minimum pass marks of 8 or 9.

Question 8.

You are called to an incident involving the collision of two trains. ***Discuss*** *the factors you would need to consider, with particular emphasis on rescue.*

(20 marks)

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It was evident from their answers that candidates who attempted this question had not read the relevant bibliography. The question placed the emphasis on ***rescue*** but too many candidates focused on the practical aspects and did not concentrate on the incident overall. Many candidates failed to complete the following procedures on arrival at the incident:-

a) Confirm the location
b) Establish where the access points were
c) Assess the situation
d) Request information from the rail network authority.

Paper 7: Aero Fire Studies.

Question 1.

Discuss *the responsibilities that airport fire service managers should exercise in providing training resources and facilities.*

(20 marks)

On the whole candidates demonstrated poor understanding in answering this question and this was reflected in their answers, which should have focused on items such as ***Training Risk Assessments***, ***Training Records***, and ***Training Needs Analysis***.

Question 2.

a) ***Describe*** *the environmental impact of fire-fighting foams.*

(9 marks)

b) ***Explain*** *the measures that should be taken to prevent the pollution of water courses and rivers in particular.*

(11 marks)

Generally candidates who attempted this question did not answer it well. In part a) the question required them to cover the basic issues of ***toxicity***, ***biodegradability*** and **dilution**. Candidates wrote better answers to part b) and dealt in detail with operations such as ***containment*** and ***removal***.

Question 3.

a) ***List*** *the factors affecting the degree of biological damage to the human body from a radioactive source.*

(6 marks)

b) ***Explain*** *the* ***inverse square rule*** *in relation to radiation exposure.*

(7 marks)

c) *With the aid of a diagram,* ***describe*** *fully the hazard label for radiation.*

(7 marks)

Easy marks were missed by candidates as the question asked for a diagram and few provided one. Many candidates asserted **wrongly** that the degree of biological damage is related to time, shielding and distance. Unfortunately it was clear that many candidates did not read the question properly and included irrelevant passages in their answers.

Question 4.

*The concept of **aircraft incident command** has a number of key features.*

a) ***List** and **detail** what these key features are.*

(13 marks)

b) ***Outline** the issues that may arise after an aircraft incident in which the fire service has been involved.*

(7 marks)

This question was popular with candidates but unfortunately they did not fully understand what was required of them and as a result they did not answer it well. Answers should have revolved around the ***strategy, tactics, operations, control and the resources*** of the ***incident commander***. In part b) candidates failed to understand that fire service personnel could be involved in ***post mortem enquiries, coroner hearings, litigation, public enquiries, criminal investigations and accident investigations.***

Question 5.

***Examine** the human and environmental effects of **aerodrome hazards**, including the measures needed to reduce the risks involved to acceptable levels.*

(20 marks)

Many candidates who attempted this question should have demonstrated a better understanding that the following were at risk from aerodrome hazards:-

a) Airport workers and staff
b) Air crew
c) Passengers
d) Local communities
e) The environment.

Candidates should have taken a more ***holistic view*** of this subject and focused on controls and procedures backed up by a positive ***safety culture***, ***emergency plans*** and an ***audit and review process***.

Question 6.

***Discuss** the subject of aircraft fire safety, making special reference to the protection of the new generation of aircraft such as the **Dreamliner**.*

(20 marks)

Unfortunately few candidates did well in answering this question. In covering the fire safety aspects of the new generation of aircraft, the items that should have been covered include the following:-

a) On board oxygen generating systems
b) Glare
c) Water mist
d) Firefighting systems
e) Aircraft design
f) Cabin safety, smoke and fire detection.

Question 7.

Evaluate *the requirements for access and egress roads and gates at aerodromes.*

(20 marks)

Many candidates misunderstood the terms used in the question. The ***access*** and ***egress*** roads and gates do not refer to the road systems in and out of the airport, but to the ***airside*** roads of an airport. Candidates failed to mention the ***construction and maintenance of roads***, the ***width and load bearings***, the markers used at edges of roads. Gates were similarly poorly answered.

Question 8.

Discuss and evaluate *the fire fighting and fire protection measures that may be installed in aircraft hangars.*

(20 marks)

This was another popular question with candidates, but unfortunately many of them failed to answer it properly. The question specifically asks **for *fire-fighting*** and ***fire protection measures***. Candidates who mentioned ***sprinklers***, ***deluge systems***, ***oscillating foam monitors***, ***thermal detection*** and the ***rate of rise detection*** all earned high marks.

<u>Paper 8: Fire Investigation,</u>

Question 1.

The methodology of a fire investigation follows a systematic approach. This systematic approach, often known as the ***scientific method****, has clearly defined steps.*

a) ***Describe briefly*** *these steps.*

(8 marks)

b) ***Explain*** *the importance of each step in the context of a fire investigation.*

(12 marks)

This was not a popular choice of question and those candidates who attempted it either wrote very accurate and detailed responses or they misunderstood the question and were struggling to include relevant information in their answers.

Question 2.

You are called to investigate a vehicle fire.

a) ***List TEN*** *examples of potential evidence or information that may be found at the scene or acquired from other sources.*

(5 marks)

b) *For* ***FIVE*** *examples from the list above,* ***explain*** *in detail how this evidence and information will assist you in determining the origin and cause of the fire.*

(15 marks)

This was a straightforward routine question which proved popular with candidates. Generally they answered it well and included most if not all of the examples requested.

Question 3.

Fire and explosions frequently accompany each other.

a) ***Identify*** *the types of explosion that may be encountered by investigators.*
(6 marks)

b) ***Describe*** *the indicators that an investigator would expect to find for* ***ONE*** *of the types of explosion identified in the first part of your answer.*
(14 marks)

This question met with a mixed response from candidates, varying from some excellent scripts right through the range to extremely poor.

Question 4.

You are investigating a small fire in a bathroom ceiling. The area of origin appears to be a sealed mains voltage halogen light bulb and fitting with a mains voltage of 230 Volts. The fitting is rated at 20 Watts. The halogen bulb is intact, but has no markings on it. You are able to measure the resistance of the bulb at 1060 Ohms.

a) *Using the given formulae below, calculate the power rating of the bulb in Watts.*
(6 marks)

V=IR; P=VI.

Where: *V= Voltage (Volts)*
I = Current (Amps)
R= Resistance (Ohms)
P= Power (Watts)

b) *In your professional opinion, could the bulb and light fitting have been the ignition source for the fire?* ***Explain*** *the reasons for this conclusion, basing it on the calculation of the power rating of the bulb.*
(14 marks)

This was a straightforward question although some candidates made unfortunate errors in completing the calculation. The answers to part b) indicated that in general candidates did not have a good working understanding of electrical theory.

Question 5.

When giving evidence in a court of law during the course of a fire investigation:-

a) ***Discuss*** *in detail, the role of the* ***expert witness****.*
(10 marks)

b) ***Identify in detail*** *examples of* ***THREE*** *types of evidence that can be given to the criminal court.*
(10 marks)

Many candidates attempted this question, but despite its popularity they did not answer it accurately or in detail and it was clear that in many cases, candidates were reduced to guessing the answer.

Question 6.

In order to deduce the cause and development of a fire, it is important that the investigator has an understanding of heat transfer. ***Discuss*** *the importance of* ***conduction****,* ***convection*** *and* ***radiation*** *in* ***each*** *of the following processes:*

a) Ignition of a 10cm deep pool of combustible liquid.

(5 marks)

b) Ignition of a thick combustible solid.

(5 marks)

c) Flame spread on a vertical surface.

(5 marks)

d) Flashover in a domestic sized room.

(5 marks)

The key to answering this question successfully lay in the discussion of ***conduction, convection*** and ***radiation*** and this was made explicit in the wording of the question. Unfortunately most candidates who attempted this question neglected to discuss the importance of these aspects in any depth.

Question 7.

Investigators use a variety of methods to record the fire scene that will support a subsequent report or statement.

a) ***List and describe*** *four different methods that investigators conventionally use to record* ***fire scenes****.*

(10 marks)

b) ***Discuss*** *the relative merits of, and the problems associated with, each of the four methods you listed and described in your answer to the first part of this question.*

(10 marks)

Most candidates who addressed this question answered part a) well and accumulated good marks from a straightforward question. Part b) required a discussion comparing the merits and problems associated with the methods described earlier and although this was only a natural progression from part a) on the whole candidates did not answer it well or thoughtfully.

Question 8.

a) ***Outline*** *the stages of development of a compartment fire with a typical fire load. You should* ***describe in detail*** *the characteristics of all the stages and* ***explain*** *how fuels are affected in each of them.*

(10 marks)

b) With particular regard to ***temperature*** *and* ***plume height****,* ***describe*** *and* ***account for*** *the different behaviours of the following types of fire:-*

i. An unrestricted fire that is open on all sides.

ii. A fire situated against a non combustible wall or in a corner.

(10 marks)

This was another routine or “bread and butter” question, but some candidates showed limited knowledge about very basic fire dynamics. However, the question allowed knowledgeable candidates to excel and a number of them produced some very fine answers that earned them high marks.

Paper 11: Civil Emergency and Disaster Management.

As in 2008, this was very much a minority examination paper, taken by a small number of candidates. With such a small sample, it is not possible to generalise about the standard of the answers or about the questions candidates found straightforward or difficult. The quality of the scripts submitted this year showed a growing disparity between candidates who excelled at the paper, scored high marks and were awarded very good grades and those who struggled to achieve a pass at all. The questions are reproduced below:-

Question 1.
*In relation to the framework for planning for disasters and emergencies, there are **seven** general principles that should be included in a **planning framework**.*

***List** these seven principles and briefly explain each.*

(20 marks)

Question 2.
*In relation to training for disasters and emergencies, there are **six** key training topics that form the core of successful planning objectives in disaster preparedness. They are likely to be relevant to all agencies involved in a combined response.*

***State** and **briefly outline** each of the six key topics.*

(20 marks)

Question 3.
***With the aid of a diagram, describe** the roles and responsibilities of each emergency agency at a major incident as follows:-*

a) Within the inner cordon.

(6 marks)

b) Within the outer cordon.

(7 marks)

c) Outside the outer cordon.

(7 marks)

Question 4.
Initial reports that a major incident has taken place may come from a number of sources. In order to determine the most appropriate response, it is important to get accurate and relevant information.

***List and describe** the types of information required by the emergency services.*

(20 marks)

Question 5.
Survivors from major incidents are usually transported to a Survivor Reception Centre or Rest Centre that is set up by a local authority or similar organisation.

***Describe** the facilities that these centres should provide.*

(20 marks)

Question 6.
Recent disasters have proved that major incidents cannot be dealt with in isolation and this has influenced all organisations to set common objectives in pre-planning major events.

***List** these objectives and give an **example** of each.*

(20 marks)

Question 7.
*There is increasing evidence to support the concern that rescue workers and helpers at major incidents are vulnerable to the effects of stress resulting from exposure to **critical incidents**.*

a) ***Define** the term **critical incident**.*

(5 marks)

b) ***Discuss** the sources of stress arising from **critical incidents**.*

(15 marks)

Question 8.
*In the event of a major incident occurring in their area, emergency services should have a plan to ensure that they can maintain their core **critical functions**.*

***Describe** the **critical functions** that a fire and rescue service should be able to deliver during a major incident in its area.*

(20 marks)

Graduateship Examinations.

Paper 1: Fire Safety.

Question 1.
When investigating whether or not a particular electrical appliance was the possible cause of a fire, what are the factors that should be considered in an initial investigation?

(20 marks)

This proved to be a very popular question. The general fire investigation principles were not asked for, yet many candidates offered this and scored few marks. Those candidates who earned higher marks did so by answering the question directly and concentrating on the properties of electrical appliances as a cause of fire.

Question 2.
*Which items should be included in a typical and comprehensive **fire safety record**?*

(20 marks)

A large number of candidates discussed the details that should be included in a fire risk assessment instead of answering the question directly. Better scripts identified the ***full range of items*** that form part of a fire safety record and thereby obtained good marks.

Question 3.

a) *The **means of escape philosophy** for fire engineered buildings is based on time related factors. When calculating the time needed for escape, what are the criteria that should be taken into account?*

(8 marks)

b) ***Occupant characteristics** should identify the types of person in the building and their actions at the time of the fire. What should be included in a list of **occupant characteristics**?*

(6 marks)

c) *What will the **evacuation strategy** for a fire engineered building determine?*

(6 marks)

Many candidates did not understand the question and as a consequence their scripts attracted low marks for the most part. The crucial term to take into account when answering this question was ***fire engineered building*** not ***means of escape***.

Question 4.
You have been asked to give fire safety advice to the manager of a hostel. The hostel is about to receive a tenant with a long history of fire-setting behaviour.
***Outline** and **account for** the advice you would give.*

(20 marks)

Many candidates achieved high marks for this question. However, a lot of candidates did not focus on the ***fire-setting behaviour*** aspect of the question and proceeded to give basic fire safety advice for facilities the hostel should have had in place already, which attracted few marks.

Question 5.
Describe *in detail the criteria for deciding the location of emergency lighting luminaires.*

(20 marks)

This was a straightforward question to answer and it proved a popular one with candidates. Many scripts gained high marks for detailed relevant answers.

Question 6.
In order to safeguard the safety of people in a building for which you have responsibility, ***describe*** *and* ***explain*** *the control features you would provide at fire exits and along fire exit routes.*

(20 marks)

Some candidates answered this question well and their answers demonstrated that they had covered the syllabus thoroughly. However a considerable number of scripts lacked detail and clearly showed that candidates should have prepared themselves more comprehensively to deal with topics like this one.

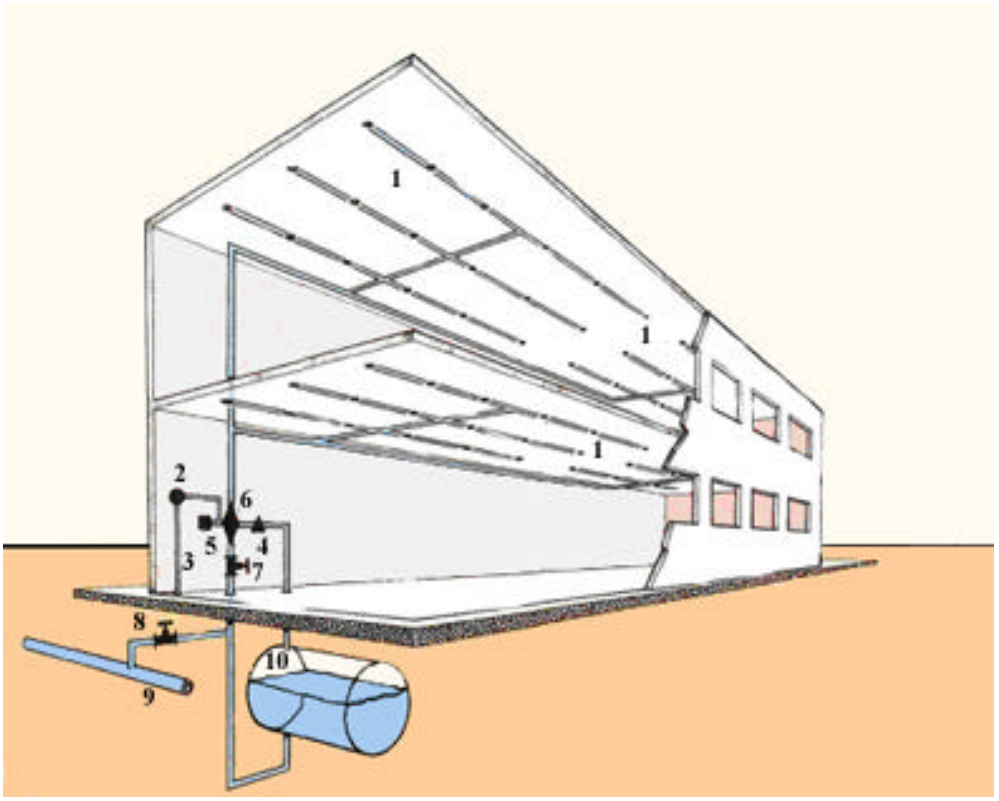
Question 7.
Summarise *and* ***explain*** *the fundamental principles of fire investigation when fatalities occur as a result of a fire.*

(20 marks)

This was another popular question with many candidates, but in general they answered it poorly. Many scripts went into the details of how to ***carry out*** the investigation, omitting summaries and explanations about the fundamental ***principles*** on which the question actually focused. Many marks were lost when candidates failed to refer to the involvement of the police and to take simple ***scene preservation*** measures.

Question 8.

The diagram below shows the layout of a typical sprinkler system.



a) ***Identify*** *the labelled parts numbered 1 – 10.*
(Remember to write the list on your answer script. Please do ***NOT*** *label the diagram on the question paper.)*
(10 marks)

b) *What are the three graded categories of water supply for sprinklers?*
(3 marks)

c) ***List*** *the acceptable sources for the following:-*

i. A superior supply for a low rise system.
ii. A superior supply for a high rise system.
(7 marks)

This was another straightforward question which proved to be popular with candidates, many of whom had revised the subject matter thoroughly and gained high marks.

Question 9.

Outline *and* ***briefly explain*** *the features of a fire resisting door set.*
(20 marks)

This question was another that afforded candidates the opportunity to gain high marks. However, there was evidence in some candidates' answers of confusing ***fire doors*** with ***fire exit doors***, which are fundamentally different from each other.

Question 10.

*a) Give a **brief description** of the following roof types:-*

i. Close coupled roof.
ii. Mansard roof.
iii. Trussed roof.
iv. Portal or rigid frame roof.
v. Monitor roof.

(10 marks)

*b) **Describe briefly** the behaviour of the following roofing components in a fire:-*

i. Connectors.
ii. Slates and tiles.
iii. Trussing.
iv. Steelwork.
v. Concrete.

(10 marks)

Generally, the candidates who attempted this question answered part a) very well. Candidates who supported their description of various roofing types with simple labelled diagrams attracted the highest marks. Some candidates struggled with part b) however. The best scripts described the behaviour of the various roofing components in relation to their specific use in a roof structure, whereas other scripts provided just a general explanation of the performance of the material when involved in fire.

Paper 2a: Operations.

Question 1.

*a) **Define** the term and **discuss** the possible indicators of a **backdraught**.*

(10 marks)

*b) What safety precautions can firefighters employ to reduce the risk of a **backdraught** occurring and to mitigate the effects of one that has occurred?*

(10 marks)

Although many candidates wrote good answers to this question, some of them gave the definition of ***flashover*** instead of ***backdraught***. Other candidates lost marks by suggesting safety critical actions such as "*take your glove off and test with the back of your hand*".

Question 2.

*a) **Define ventilation** specifically in relation to firefighting.*

(5 marks)

*b) In relation to high rise buildings, **discuss** the benefits of **tactical ventilation, comparing** these benefits with the adverse effects caused by wind or building design.*

(15 marks)

This question was not popular with candidates and their answers were not well written on the whole. Only a few candidates were able to define ***ventilation*** clearly in part a) and so the majority lost the opportunity to pick up easy marks.

Question 3.

What precautions should be taken when working near to electrified rail systems?

(20 marks)

A number of answers to this question demonstrated that candidates should read questions carefully before answering them. Some candidates lost marks for not making the safety of the firefighters involved in an incident of this type a top priority.

Question 4.

As the officer in charge of an appliance you are called to a major road traffic accident on a multi lane highway. On arrival you see several vehicles involved with possible multiple fatalities and casualties.

a) ***Describe*** *the primary and immediate role of the fire service at this incident.*

(10 marks)

b) ***Identify*** *the* ***tactical priorities*** *that you should adopt.*

(10 marks)

Many candidates appeared not to understand the question and failed to cover the salient points for each section, which were:-

a) This section involved fending off positions, coning the scene and securing the safety of firefighters.
b) Priorities included creating space around the casualties and stabilising the vehicles.

Generally, candidates who attempted this question did not answer it well. A more in-depth study of the source materials would have equipped them with the necessary detail.

Question 5.

Officers in charge of incidents have a number of responsibilities and duties.

a) ***Describe*** *the key elements of the role of officers in charge when they are attending incidents.*

(10 marks)

b) In relation to incident command, ***discuss*** *and* ***explain*** *the terms* ***strategic****,* ***tactical*** *and* ***operational****.*

(10 marks)

Many candidates described the various officers who are utilised for ***command and control*** at incidents, whereas the question focused on the ***responsibilities of officers in charge***. A number of candidates failed to understand strategy and some wrote about gold, silver and bronze command structures.

Question 6.

Explain *how fire spreads within buildings.*

(20 marks)

This question called for an explanation of the mechanisms by which fire spreads within buildings. Some candidates listed the apertures through which fire can pass, but in so doing they missed the point of the question.

Question 7.

***List** and briefly **discuss** the reasons for suspecting arson at a fire.*

(20 marks)

Many candidates who attempted this question failed to read it carefully and rather than focus on the ***reasons for suspecting*** arson, they concentrated instead on ***recognising the signs*** of it. They demonstrated a very limited knowledge of the subject and they would have done better to have chosen a different question altogether.

Question 8.

*a) **Describe** a **Tirfor winch** and **explain** how it is operated.*

(10 marks)

*b) **Describe** a lowering line and **explain** how it is used.*

(10 marks)

The candidates who attempted this question invariably failed to consider the ***safety precautions*** of the Tirfor winch when it was being used. The minority of candidates who went on to attempt the section on the ***lowering line*** attracted good marks for this section.

Question 9.

***9.** With the aid of a fully annotated diagram, **describe** a typical **foam branch** and **explain** its operating principles.*

(20 marks)

Although some candidates provided excellent fully annotated diagrams, it was evident that others had not understood the question and gave descriptions of complete foam making systems or included diagrams that covered the passage of foam from the pump to the branch. While these descriptions and diagrams were often correct, they could not earn high marks as they were largely ***irrelevant***. Candidates needed to show detailed knowledge about the ***design, construction and operating principles*** of the foam branch in order to be awarded high marks.

Question 10.

*a) **Describe** the aim of salvage work at a fire.*

(3 marks)

*b) **Detai**l the main causes of losses at fires.*

(7 marks)

*c) **Explain** how water damage can be prevented and mitigated.*

(10 marks)

This was not a popular question but it did provide candidates with a good opportunity to gain marks quite easily. Many of those who answered the question missed the opportunity to apply their practical knowledge in order to achieve good marks. Some candidates discussed insurance and security for valuable items in detail: while this is relevant, it is only a small part of salvage operations as a whole.

Paper 2c: Aero Fire Studies.

Question 1.
With reference to establishing overall control at an aircraft accident:-

a) ***Explain*** *the principles of* ***zoning****.*
(12 marks)

b) ***Draw*** *a plan to illustrate* ***zoning****.*
(4 marks)

c) ***Describe*** *the purpose and location of an* ***Incident Control Point*** *within the system of* ***zoning****.*
(4 marks)

This question was popular with many candidates, most of whom answered it well. However, a number of candidates omitted to draw the plan to illustrate zoning, thus losing the opportunity to gain four marks quite easily.

Question 2.

a) ***List*** *the common causes of aircraft passenger cabin fires.*
(8 marks)

b) ***Explain*** *the range of hazards for firefighting personnel which result from aircraft internal cabin fires.*
(12 marks)

Although this was a straightforward question, generally it was rather poorly answered by candidates who attempted it. Many candidates tried to cover every type of aircraft fire situation rather than concentrate on the focus of the question, which was about ***internal passenger aircraft cabin fires***.

Question 3.

a) *In relation to freight and dangerous goods,* ***list*** *the classes of hazardous materials.*
(9 marks)

b) ***List*** *the information to be found on a* ***Dangerous Goods Transport Document****, also known as a* ***Shippers Declaration for Dangerous Goods.***
(11 marks)

This was another straightforward question that proved to be very popular with candidates, many of whom achieved very high marks.

Question 4.

Describe *the* ***general factors*** *to be considered when entering an aircraft that has been involved in an accident, specifying the* ***particular methods*** *of entry.*
(20 marks)

Few candidates chose to answer this question. This was unfortunate because it provided the opportunity to gain high marks for those who were prepared to think through the options and practical considerations rationally.

Question 5.

a) ***Define*** *the following terms in relation to foam:-*

i. Aspirated foam.
ii. Induction ratio.
iii. Application rate.

(9 marks)

b) ***List*** *the advantages and disadvantages of* ***Film-Forming FluoroProtein Foam*** *(FFFP).*

(11 marks)

Knowledge and understanding on this topic is a basic necessity for airport firefighters, and candidates who attempted it should have been able to score high marks for their answers. It was disappointing to see few good answers and to witness a low level of basic knowledge about the primary media for aviation firefighting.

Question 6.

Describe *the problems encountered by Fire and Rescue Personnel from the use of* ***Man Made Mineral Fibres*** *(MMMFs) in aircraft construction.*

(20 marks)

This was not a popular question but one which, with a little reading, should have enabled candidates to achieve high marks. With the new generation of aircraft under development and coming into service there is a massive amount of literature available about this topic.

Question 7.

Explain *the concept of* ***critical area*** *in relation to fixed wing aircraft.*

(20 marks)

Surprisingly, this was a popular question which produced some very good scripts from candidates who had studied the material. However, some very poor answers came from candidates who had not revised the syllabus thoroughly.

Question 8.

a) ***Detail*** *the purpose of a* ***Post Accident Investigation****.*

(2 marks)

b) ***List*** *the official documents which should be collected and handed to the investigation agency.*

(8 marks)

c) ***List*** *the actions which should be undertaken by fire-fighting personnel to assist in* ***Post Accident Investigations****.*

(10 marks)

As with question 5, this question also required good levels of knowledge and understanding as a basic necessity for airport firefighters. On the whole the answers were detailed and accurate, earning good marks for those candidates who attempted it. The question required lists and no extra marks were awarded for long drawn out descriptive answers.

Question 9.

Discuss *the problems likely to be encountered when dealing with accidents in the* ***undershoot*** *and* ***overshoot*** *areas of an airfield.*

(20 marks)

Despite well-reported and well-documented accidents such as that involving the Boeing 777 at Heathrow in January 2008, this question was less popular with candidates than expected. The question asked candidates to discuss problems and issues rather than write these down in the form of narrative lists. Those candidates who were awarded low marks let themselves down by not addressing the question in the way they were asked to do so.

Question 10.

a) ***List*** *the* ***FOUR*** *main types of jet engine.*

(4 marks)

b) ***List*** *the* ***FIVE*** *zones of a typical jet engine.*

(5 marks)

c) ***Describe*** *the likely hazards and difficulties you may encounter when dealing with incidents involving aircraft engines.*

(11 marks)

Many candidates recognised this as a straightforward question to answer, and in most cases they answered it well and earned high marks. Surprisingly a number of candidates submitted lists of details that referred to radial engines. Needless to say, no marks were awarded for lists about this type of engine.

Paper 3: Fire Engineering Science.

Question 1.

a) ***Describe*** *fully the function of a nozzle.*

(5 marks)

b) ***Outline*** *the factors of supply which will affect the maximum height of a firefighting jet.*

(4 marks)

c) *If the pressure of a 20mm nozzle is 8 bar(s),* ***calculate*** *the jet reaction of the branch.*

(6 marks)

d) *What* ***criteria*** *should you use to select an effective nozzle for firefighting?*

(5 marks)

This question asked for both theoretical and applied knowledge. Unfortunately (and surprisingly,) few candidates who attempted this question were able to provide sufficient knowledge of either to earn high marks.

Question 2.

a) ***Give detailed definitions*** *of the following terms:-*

i. *Brake power.*
ii. *Pump efficiency.*
iii. *Work.*
iv. *Power.*

(12 marks)

b) *What is the water power of a pump delivering 4000 litres per minute at a pressure of 6 bar(s)?*

(4 marks)

c) *What will be the brake power required to drive the pump at an efficiency of 75%?*

(4 marks)

A number of candidates were able to gain maximum marks for their answers to this question. The definition plus calculation format evidently inspired them as much as it discouraged others. However, this was a straightforward question with the potential to earn high marks for any candidate.

Question 3.

a) ***Describe*** *fully the process of radioactive decay.*

(10 marks)

b) ***Explain*** *how the resulting rays and particles are produced and compare their penetrating power.*

(10 marks)

This two part question was answered unevenly by many candidates who generally provided good responses to part b) although some of them ignored part a) altogether.

Question 4.

a) ***Define*** *the terms* ***Specific heat capacity*** *and* ***latent heat****.*

(8 marks)

b) *A solid copper block has a mass of 5kg and is heated for 8 minutes by an electrical heater at a voltage of 25 Volts and a current of 2 Amps. If the temperature of the copper rises by 10K,* ***calculate*** *the specific heat capacity of the copper.*

(12 marks)

This straightforward “define and calculate” style of question was popular with candidates, although only a very small number of them achieved the maximum score.

Question 5.

a) ***Explain*** *fully the* ***Combined Gas Law****.*

(6 marks)

b)

i. *A breathing apparatus cylinder has a pressure of 208 bar(s) and a water volume of 9 litres. Calculate the maximum amount of air in the cylinder at this pressure.*

ii. *A breathing apparatus cylinder has a pressure of 160 bar(s) at 23^0C. If the pressure in the cylinder rises to 208 bar(s), what will be the temperature of the air?*

(8 marks)

c) *Outline* ***THREE*** *factors which affect the duration of breathing apparatus worn at incidents.*

(6 marks)

Most candidates who attempted this popular question gathered marks across all parts of it: generally they achieved a pass mark. This is a classic example of a tripartite question that asks candidates to ***explain or define*** a scientific principle, ***make a calculation*** on the basis of it and ***apply that knowledge and understanding*** in a practical context.

Question 6.

a) ***Define*** *fully the following terms:-*

i. *Molecular weight.*

ii. *Balanced equation.*

iii. *Valency.*

(10 marks)

b) ***Balance*** *the following equations:-*

i. $Fe_2O_3 + Al_2 = Al_2O_3 + Fe + Heat$

ii. $C_3H_5(NO_3)_3 = CO_2 + H_2O + N_2 + O_2$

(10 marks)

Unfortunately, few candidates scored well on a straightforward question where a basic knowledge of chemistry would have equipped them to achieve a high mark.

Question 7.

a) ***Explain*** *in detail the hazards involved and the firefighting actions to be taken when dealing with fires involving metals.*

(15 marks)

b) *Provide a* ***balanced equation*** *to show how sodium reacts with water. (****Explain*** *fully all the stages of the reaction.)*

(5 marks)

A small number of candidates provided good answers to this question but a larger number gave responses which ignored the ***burning of metals*** and gave detailed answers about ***metal structures*** instead.

Question 8.

a) *Give a **detailed description** of a typical electrical distribution network. (Your answer should include details of typical voltages and types of system.)*

(12 marks)

b) *Fires close to high voltage power lines can present hazards to firefighters.*

i. ***Identify** these hazards.*

ii. ***Explain** in detail the precautions that have to be taken.*

(8 marks)

Many candidates attempted this question with mixed results. Candidates who offered detailed descriptions about ***generating schemes*** and ***domestic wiring*** did not gain high marks when the question asked for a description of an ***electrical distribution network***.

Question 9.

a) *Give a detailed **definition** of the term **hydrocarbon**. In your answer, provide **THREE** examples of **aliphatic compounds**.*

(6 marks)

b) ***Explain** the hazards associated with petrochemical sites.*

(7 marks)

c) ***List** the basic considerations that an officer in charge should take into account when dealing with a large tank fire.*

(7 marks)

This question afforded reasonably generous marks for a *definition* and many candidates scored well with this part of their answer. However, the other parts of the question asked for *applied knowledge* and they were not answered as well. This is surprising, particularly in view of the publicity surrounding the Buncefield fire several years ago.

Question 10.

The following data was obtained whilst conducting research into the amount of power dissipated when a current of 5 amps was flowing though materials of differing resistance. Parts of the results are shown in the table below:-

Resistance (Ohms)	*1*		*8*	*10*		*20*	
Power (Watts)	*25*	*125*		*250*	*375*		*625*

a) *First, **copy** the table above into your answer book. Then **complete** the table, showing all working out.*

(8 marks)

b) *Using this data, **draw** a graph and clearly **mark** on it the following:-*

i. *The resistance at a value of 400 Watts.*

ii. *The power at a resistance of 35 Ohms.*

(12 marks)

This was another straightforward question which proved to be a favourite with many candidates, most of whom grasped the opportunity it offered them to secure high marks in answering it.

Paper 4: Human Resource Management.

Question 1.

*a**)*** ***Explain** the meaning of the term **benchmarking**.*

(3 marks)

b) ***Identify** why benchmarking is used by organisations.*

(8 marks)

c) *What are the factors organisations need to take into account when using information from a benchmarking exercise?*

(9 marks)

This question was poorly answered generally, with candidates omitting to explain ***why*** benchmarking is used or neglecting to outline the factors to be taken into account when ***using information*** gathered from benchmarking exercise.

Question 2.

You have been asked to Chair a meeting.

a) ***Explain** the role of the Chair in the running of a successful meeting.*

(15 marks)

b) *What organisational arrangements would you consider before the meeting is held?*

(5 marks)

Overall, the scripts for this exam paper produced some good answers but many candidates relied on their knowledge of the meetings they had attended rather than use the information and ideas supplied by the bibliography. Unfortunately as a result of this they did not attract high marks.

Question 3.

a) ***Explain** why an effective **grievance procedure** is important to an organisation.*

(11 marks)

b) ***Describe** the different stages usually found in a **grievance procedure***

(9 marks)

There was a wide range of responses to this question, with some candidates confusing ***grievance procedures*** with ***disciplinary procedures***. A basic error such as this severely limited the chances of these candidates to gain high marks for their answers.

Question 4.
Identify *the* ***leadership skills*** *which are important when major changes are being introduced within an organisation.*

(20 marks)

In this question, leadership skills were set within the context of ***organisational change***. While some candidates gave detailed answers on leadership ***styles*** and leadership ***qualities***, this was not what the question required, and so these candidates received low marks.

Question 5.

a) ***Explain*** *the meaning of the term* ***hazard****.*

(6 marks)

b) ***Outline*** *the ways in which managers can encourage a positive attitude to health and safety amongst employees.*

(14 marks)

This was a popular question and the term ***hazard*** was generally explained well in candidates' answers. They would have been awarded higher marks had they cited examples when outlining ways in which managers can encourage positive health and safety ***attitudes*** amongst employees. Many candidates digressed by describing ***risk assessment*** and ***welfare matters*** rather than focus on issues that affect the ***health and safety culture*** of the workplace.

Question 6.

a) ***Explain*** *why* ***budgetary controls*** *are important in public service departments.*

(8 marks)

b) ***Discuss*** *a number of points of good practice you would consider in developing a budgetary control system.*

(12 marks)

This question produced some very good answers, with many candidates showing they had studied the syllabus and prepared for the examination effectively.

Question 7.
Describe *in detail the role of managers in the training and development of their staff.*

(20 marks)

This question focused on the ***role of managers in providing training and development*** for their colleagues. However, the answers submitted by many candidates concentrated instead on the ***types of training*** that could be provided or delivered. This amounted to a basic misreading of the question and it led candidates into writing answers that were often irrelevant.

Question 8.
Describe *the practical steps organisations can take to establish working conditions that provide greater opportunities for promotion and career development to employees who are parents and carers.*

(20 marks)

This was not a popular question amongst candidates, but those who did attempt an answer to it wrote good answers generally and were awarded very reasonable marks.

Question 9.

a) Which factors would influence your decision to delegate work to a subordinate?

(8 marks)

b) What are the major barriers to delegation?

(12 marks)

On the whole this question was poorly answered and many candidates often gave similar answers to parts a) and b). There is a substantial difference between each part to the question however, with part a) asking for ***positive*** factors that ***promote delegation*** and part b) asking for the ***negative*** factors that ***militate against*** delegation.

Question 10.

Discuss *the possible ways in which employees can participate in decision-making at work.*

(20 marks)

On the whole this question was not answered well by candidates, many of whom relied exclusively on general knowledge or examples from their own experience. Those candidates who had covered the syllabus and studied the reading material were awarded high marks for detailed and comprehensive answers.

Paper 5: UK Operations.

Question 1.

a) ***Describe*** *the passage of air from the cylinder to the demand valve of the breathing apparatus set.*

(10 marks)

b) ***Outline*** *the full standard test for the set.*

(10 marks)

For the most part, candidates who attempted this question answered it very well. However, there were still some exceptionally poor answers to what was a routine "bread and butter" question.

Question 2.

You are the incident commander at a fire in a factory unit of approximately 2000 square metres. ***List*** *and* ***describe*** *concisely the* ***command functions*** *you will consider during the incident.*

(20 marks)

Candidates who attempted this question generally achieved mid-range marks for their answers. Although no-one scored high marks there were some very poor answers to what was a straightforward question.

Question 3.

a) ***Define*** *the different types of ventilation used in firefighting.*

(4 marks)

b) In relation to high rise buildings, ***discuss*** *the benefits of* ***tactical ventilation,*** ***comparing*** *these benefits with the adverse effects caused by wind or building design.*

(16 marks)

This question was not popular with candidates and their answers were not well written on the whole. Only a few candidates were able to define ***ventilation*** clearly in part a) and so the majority lost the opportunity to pick up easy marks.

Question 4.

In relation to flooding, ***discuss*** *the following in detail:-*

a) ***Describe*** *the* ***risks*** *that may present* ***hazards*** *to those who are trapped by floods, as well as their rescuers.*

(10 marks)

b) ***Discuss*** *in detail the hierarchy of rescue in relation to water incidents.*

(10 marks)

There were many good answers to this question which showed a good grasp of the issues it raised. However, it was a cause for concern that some candidates were prepared to see firefighters enter floodwater in full kit with just a rope tied around them. This is a safety critical matter: these candidates should have realised that the safety of firefighters is a priority.

Question 5.

As an ***incident commander****, your role has several responsibilities and duties.*

a) When taking charge of an incident, what information would you expect from a thorough handover from a junior officer?

(12 marks)

b) In relation to incident command, ***describe*** *and* ***discuss*** *the following terms in detail:*

i. ***Bronze****,* ***silver*** *and* ***gold*** *command.*

ii. ***Cordons*** *and* ***sectorisation****.*

(8 marks)

The majority of candidates who answered this question appeared to understand the concept of ***handover*** in part a). However, they would have achieved higher marks if they had shown more strategic awareness. In part b) many candidates gave confused descriptions of ***bronze silver*** and ***gold command*** yet they clearly understood the methodology involved in ***cordons*** and ***sectorisation***.

Question 6.

In relation to a high rise property above 10 floors comprised of single occupancy dwelling flats:-

a) ***Discuss*** *operational considerations, tactics and incident command when dealing with a significant fire.*

(12 marks)

b) ***Compare*** *the difficulties incident commanders should expect with the beneficial design features of the building that could assist them when developing tactics to fight the fire.*

(8 marks)

This question was well answered on the whole, but many candidates relied on their experience rather than the bibliography in putting together their answers. Confused sectorisation was a problem for many candidates. Others deployed BA crews before ensuring water supplies were achieved and as this was a safety critical issue, they lost marks.

Question 7.

You are the incident commander at a fire involving a large quantity of commercial fertiliser on a remote farm. The fertiliser may contain ***ammonium nitrate****.* ***Explain*** *the firefighting procedures you would adopt.*

(20 marks)

Although this question was generally answered well by the majority of candidates who attempted it, some were unaware that fertiliser containing ammonium nitrate can explode if it is subjected to high temperatures.

Question 8.

You are the incident commander of the initial attendance at a fire in a large commercial premises of several floors. ***Detail*** *your considerations in* ***estimating*** *assistance.*

(20 marks)

Many candidates forfeited marks when answering this question because they wrote too briefly, submitting a list of their considerations without providing a sufficiently detailed answer. For example, they did not consider the type and structure of the building on fire or the fire resistance of the building itself. Some candidates clearly lacked an understanding of the process for estimating assistance.

Question 9.

Discuss *the factors that have to be taken into account when dealing with a spillage of* ***hazardous materials*** *at an enclosed swimming pool.*

(20 marks)

On the whole this question was answered well, although surprisingly, some candidates failed to realise that the greatest problem they would have to deal with in this situation was going to be a spillage of chlorine.

Question 10.

Incidents involving explosive substances pose significant risks to firefighters.

a) ***Differentiate*** *between a* ***detonation*** *and a* ***deflagration****.*

(5 marks)

b) ***List*** *the principal stimuli that can initiate an explosive substance.*

(3 marks)

c) You are going to carry out an ***operational intelligence inspection*** *at a site for the manufacture and storage of explosives. What information would you seek in relation to the following?*

i. Firefighting operations.

ii. Search and rescue operations.

(12 marks)

Only a minority of candidates chose to answer this question, but for the most part those that did produced good answers which earned them high marks. Answers to part c) were often written as concise lists, but some candidates earned high marks in this section by seeking detailed information about ***firefighting*** and ***search and rescue operations***.

Paper 6: UK Leadership and Management.

On the whole it was evident that all or most candidates had understood the questions asked of them. Those who failed the paper did so because they did not provide sufficient detailed information in their answers to achieve a pass grade across the section of the syllabus represented by the six questions they answered.

Question 1.

a) What is meant by the term ***continuous professional development****?*

(7 marks)

b) What should an effective development plan contain?

(13 marks)

This was a popular question and generally it was answered well, with candidates making clear links with the IPDS process. However, in part b) some candidates concentrated too much on ***SMART*** targets, failing to identify other aspects of an effective development plan.

Question 2.

c) What benefits can working with other organisations bring to a fire and rescue service?

(16 marks)

d) How can good working relationships be maintained?

(4 marks)

On the whole this question was answered well, with candidates showing a good understanding of the benefits of working with other organisations. Many answers also cited a range of practical examples of working together.

Question 3.

What are the benefits to an organisation of having a diverse workforce?

(20 marks)

Most candidates were able to identify the benefits of a diverse work force to some extent. Others however failed to identify enough of the relevant factors in order to achieve a pass mark.

Question 4.

*e) Why is it important for an organisation to develop a **learning culture**?*

(8 marks)

f) How would you encourage colleagues to take responsibility for their own learning?

(12 marks)

This was not a popular question amongst candidates, but those who tackled it explained the importance of a learning culture and were able to show how managers could encourage the staff in their teams to take responsibility for their own learning.

Question 5.

Explain why it is important for a fire and rescue service to establish the following:-

a) Clear lines of communication within the organisation.

(12 marks)

b) Staff knowing what work they are responsible for.

(8 marks)

On the whole, candidates were not attracted to this question and comparatively few attempted it. Those that did demonstrated an understanding (to a greater or lesser extent,) of the importance of good communication. However, some candidates spent too much time describing one ***specific*** communication system.

Question 6.

How would you create a climate of trust and confidence in which your team members felt able to raise problems with you?

(20 marks)

Generally this question was answered well and candidates demonstrated a good level of awareness of all the relevant factors.

Question 7.

*Describe the qualities of an effective **manager** and an effective **leader**. What differences are there, if any, between the two?*

(20 marks)

Most candidates attempting this question described the qualities of effective managers and leaders, but some failed to recognise that the mixture and range of qualities they had identified could be found in the same person.

Question 8.

*What information would you need to explain to your team how their work contributes to the **vision** and **objectives** of your fire and rescue service?*

(20 marks)

All candidates who answered this question showed a grasp of the value of strategic planning. Some, however, spent too much time describing examples rather than specifying the information required to explain how the work of a team contributes to the overall ***vision*** and particular ***objectives*** of a fire and rescue service.

Question 9.

a) *Why is a written policy on health and safety important in the workplace?*

(6 marks)

b) ***Describe*** *the ways in which a team leader can set a good example to others in terms of health and safety.*

(14 marks)

This question was popular with candidates and on the whole they answered it well. All scripts showed awareness of the importance of a written policy, as well as the ways in which managers can lead by example. Some candidates failed to identify the cost benefits of a health and safety policy.

Question 10.

a) *What are the factors you would take into account when holding a briefing session for your team?*

(12 marks)

b) *How would you ensure that your team members have understood the information communicated?*

(8 marks)

This question was also popular with candidates. All were able to identify the ways in which they could ensure they had effectively imparted information, although some candidates spent too long writing about environmental factors rather than focus on the ***transfer of information***.