

Level 3 Certificate in Fire Science, Operations, Fire Safety and Management (All Examinations)

Examiner Report on October 2017 Examinations

Introduction

Candidate responses were generally of a high standard for all examination papers. However, as in previous examination sessions, candidates performed best on the Management and Administration paper and on the Operations paper.

Most candidates attained a higher proportion of the marks available for the multiple choice element of the question papers than they did for the short answer element of the question papers.

Although the majority of candidates were successful in achieving a Pass, most successful candidates attained marks that were within a few marks of the pass mark; ie the pass mark for these examinations is 25 marks (50%) and most successful candidates attained marks between 26 and 31 marks. Few candidates, on any of the papers, attained 40 or more of the marks available.

Fire Engineering Science (L3C1)

General

47% of candidates were successful in achieving a pass.

Multiple Choice Questions

Most candidates achieved at least half of the marks available on the multiple choice section of the examination. Candidates generally performed best on questions related to heat and chemistry.

As in previous examinations, candidates generally performed least well on questions related to hydraulics and electricity.

Many candidates made errors in calculating jet reaction in the scenario provided and in calculating the amount of water discharged by a nozzle in the given scenario. Candidates often failed to identify that the point of lowest pressure in a siphon is the crest. In responding to the questions on electricity, only one third of candidates recognised that a miniature circuit breaker is a small electromagnetic switch.

Short Written Answer Questions

As in previous papers, candidates often performed least well on the question on electricity; many candidates omitted this question completely.

Calculations: Candidates often performed well on this question. A high number of candidates provided an accurate calculation of the capacity of a length of hose although some candidates lost marks as they failed to take into account the different units (metres and millimetres) involved.

Heat: Candidates were asked to explain the terms “critical temperature” and “critical pressure”. Some candidates failed to demonstrate any understanding of the terms whilst others lost marks by providing a lack of precision in their responses. For example, candidates often correctly identified that critical pressure is the pressure required to liquefy a vapour (and attained a mark for this) but then failed to complete the explanation fully by specifying that “at its critical temperature” (which meant that they were unable to attain the second mark available for the explanation).

Factors to be overcome when pumping/lifting from open water: Most candidates identified two or three relevant factors but few attained all six marks available.

Firefighting foam: This question was generally answered well and most candidates attained a high proportion of the marks available. In response to part a), nearly all candidates correctly identified an example of a situation where firefighting foam would be used. In response to part b), candidates generally identified that the foam would exclude oxygen. However, few candidates provided the scientific/detailed explanations required to attain high marks; few referenced that firefighting foam separates flames from the fuel surface, restricts the release of flammable vapours and forms a heat barrier to reduce heat feedback and therefore further production of flammable vapour.

Electricity: As in previous examinations, candidates often performed least well on this subject. In response to part a), few candidates appeared to know that a Volt is a unit of electrical potential or motive force and few were able to explain that a Watt is a unit of electrical power/energy. Definitions of current were often better with many candidates correctly identifying that current is a measure of how much electrical charge flows through a circuit and is measured by Amps.

There were many errors in carrying out the calculation which required a calculation of Power. Many candidates failed to realise that the formula needed was $P=RI^2$ and therefore started from the wrong place.

Fire Operations (L3C2)

General

Standards were good with 84% of candidates achieving a Pass.

Candidates often attained a Pass due to their high level of performance on the multiple choice element of the paper which compensated for a poorer level of performance on the short written answer element of the paper.

Multiple Choice Questions

Most candidates performed well on the multiple choice section of the examination with the majority of candidates achieving well over half of the marks available for this section.

Most candidates appeared to have some understanding of all areas of the syllabus. However, many candidates made errors in identifying that a rotary pump is used for pumping water where the volume to be pumped is small, in recognising the operational requirements for mechanical foam generators and in recognising that medium expansion foam has proved particularly effective in dealing with fires involving hydrocarbon spills.

Short Written Answer Questions

There were many good responses to this element of the question and some candidates attained high marks.

Pre-Planning: candidates were asked to explain why the location of a site is important in pre-planning. Some candidates provided excellent responses and attained all four of the marks available – these candidates often explored issues such as access, environmental context and hazards in the vicinity that crews should be aware of. However, as in previous examinations, some candidates failed to focus on the pre-planning context and wrote at length as though they were tackling an actual incident.

Inner Cordon: Most candidates attained at least half of the marks available for this question. Some candidates failed to appreciate that four marks were available so four relevant points would be required and provided only minimal information. Candidates that went beyond the basic statement about the inner cordon surrounding the immediate risk area and included points such as controlling access to the area attained full marks.

Safety Issues at a Road Traffic Incident: Candidates who focussed on both elements of the question (ie safety issues and actions to address these) attained high marks. Some candidates wrote only about safety issues whilst others focussed only on control measures and this thereby limited the marks that they could attain. Points were often repeated in responses and again this limited the marks that could be attained.

Operation of a Centrifugal Pump: this question required technical understanding of equipment. Many candidates attained only a few (if any) marks for their responses to this question.

Pitching Extension Ladders: Candidates often recognised the need to consider the condition of the ground where the ladder was to be pitched. However, few went beyond this to consider other dangers that may be present such as: the potential dangers/obstructions above the area where the ladder was to be pitched; the need to ensure that crew members had appropriate training; and the need for the person in charge of the operation to communicate clearly to those engaged in the operation (including other personnel who have attended the incident) so that everyone was aware of the action underway.

Operating rules when donning and wearing BA: this question was often answered well. However, some candidates repeated points and others appeared to have an insufficient basic understanding of this critical area to enable them to present five relevant points.

Fire Safety (L3C3)

General

63% of candidates achieved a Pass.

Multiple Choice Questions

Candidates generally performed best on questions which addressed elements of structure and fire safety practice.

Candidates appeared to be least well prepared to answer questions related to fixed installations and alarm systems. Many errors were made in responding to questions in these areas with candidates performing particularly poorly on questions addressing types of sprinkler systems, risks protected by high velocity water spray projector systems, the operation of carbon dioxide installations and the main disadvantage of air sampling smoke detection systems.

Short Written Answer Questions

Few candidates attained high marks for this section of the question. Candidates performed particularly poorly on the questions addressing total flooding systems and the operation of automatic smoke detector systems.

Factors affecting the fire resistance of timber floors: Candidates often identified two relevant factors and attained two marks for this. However, the question asked for an explanation of the factors so the candidates who did not go on to explain the factors that they had identified missed the opportunity to attain the two additional marks available.

Stability of a brick or stone load bearing wall in fire: few candidates demonstrated sufficient understanding to attain all four of the marks available for this question. Most successfully identified that thickness in relation to height was a factor and many identified age. However, many other points could have been included to secure additional marks such as the use of proper bonding (particularly the use of headers to tie the wall together) and the effects of any horizontal pushing or levering (ie expansion of steel joists exerting lateral pressure).

Rising Mains: Nearly all candidates were able to attain marks for identifying that the two types of rising main are wet and dry. Some candidates were able to demonstrate good understanding and secure all of the marks available but many were unable to provide any detailed information at all about the operation of either of the types of rising main.

Total Flooding System: Few candidates demonstrated understanding of this type of system. Candidates should be aware that these systems operate when the media (eg CO₂, nitrogen, inert gas) is discharged into an enclosed space in a sufficient quantity to produce a concentration able to extinguish a fire throughout that space. Many candidates assumed that "flooding" referred to water and therefore described a system where compartments were flooded with water. Failure to understand this type of system meant that candidates were unable to attain the marks available for describing suitable precautions – candidates who assumed that flooding referred to water provided many inappropriate examples of precautions.

Smoke Detectors: Few candidates were able to describe the operation of either a beam smoke detector or an aspirating smoke detector and, as a consequence, were also unable to give examples

of their use. There were six marks available for this question but few candidates attained more than two marks.

Evacuation Strategies: This question was generally answered poorly. Many candidates confused staged and progressive horizontal evacuation and few candidates attained more than a few of the six marks available. Candidates should be aware that staged evacuation operates where a signal is given in the zone(s) where people are at greatest risk (eg fire zone) and an alert signal is given in other zones and to people at high risk (eg disabled individuals); phased horizontal evacuation takes place when people are moved to safe zones (compartments) on the same floor and this is used in hospitals/residential homes. Candidates often presented responses that lacked sufficient precision to secure marks; for example it was common to refer to phased horizontal evacuation as involving movement to other areas on the same floor but *without* including the critical information that these areas would be safe zones/compartments.

Management and Administration (L3C4)

General

Standards were high with 87% of candidates passing the examination.

As in previous examinations, many candidates attained high marks on the multiple choice element of the question but performed less well on the short written answer element of the examination.

Multiple Choice Questions

Most candidates performed well on the multiple choice element of the paper and achieved a high proportion of the marks available.

Most candidates appeared to have some understanding of all areas of the syllabus. The main areas of weakness appeared to be understanding of business plans and of the actions needed to ensure that delegation is effective.

Short Written Answer Questions

The majority of candidates achieved at least half of the marks available for this section of the paper. However, few candidates attained more than 20 of the 30 marks available.

As in previous examinations, candidates generally performed best on the questions focussed on people management (particularly those addressing motivation and delegation) and performed least well on the question that addressed business issues such as the importance of organisation objectives and the reasons for setting budgets at department level.

Benefits of team working for an organisation: This question was generally answered well with most candidates able to provide at least two tangible benefits for an organisation. However, some candidates failed to attain all four of the marks available as they did not focus on benefits for the organisation and instead wrote about benefits for individuals. Some candidates repeated points and others omitted relevant points such as the fact that team members could cover the work of colleagues when the colleagues were absent due to sickness or holiday.

Organisational Objectives: Most candidates identified the importance of objectives in ensuring that everyone knew what needed to be achieved. However, few candidates attained more than one mark as few focussed their response at organisation level; eg few recognised the way in which objectives enabled organisations to set priorities, focus resources, share out tasks, establish measures of success etc.

Safety Management Systems: This question was focussed on the management of safety systems. To secure high marks, candidates needed to start from a management perspective. Few candidates did this as many started from the perspective of a risk assessment. In order to secure marks, candidates needed to consider factors such as making health and safety a business priority, ensuring that senior management demonstrated commitment to the system, ensuring that resources are allocated appropriately, ensuring that staff receive training, implementing policies and procedures, setting up processes to measure outcomes and establishing systems for ongoing review.

Effects of poor communication: Candidates were required to identify and explain three possible effects of poor communication when managing a team. Most candidates were able to attain marks for identifying three relevant points. However, many candidates failed to follow the instruction to “explain” their points and this meant that they lost the opportunity to secure the additional marks available for explanation.

Features of an effective record keeping system: Candidates who recognised that features such as accuracy, accessibility, adaptability and security (in relation to confidential information) were necessary for an effective system were able to attain all three of the marks available. Some candidates wrote about how the system might be used rather than the features needed to make it effective. Unfortunately, candidates who took this approach were unable to attain marks as their responses did not address the question asked.

Importance of effective budgeting: Most candidates were able to attain at least three of the six marks available for this question. Many candidates identified basic points such as the need to ensure that the business did not overspend. Few candidates demonstrated sufficient depth to attain high marks; for example, few referenced the importance of budgets aligning with business objectives and targets and few referenced the need to consider the way that financial information can be used in planning and improving business efficiency.

Exercises: Many candidates were unable to outline the three different ways in which an exercise might be carried out. Candidates should be aware that these ways are discussion, table-top and live/simulated events. Failure to identify each type meant that candidates were also unable to attain the marks for identifying an advantage of each way. Some candidates wrote about learning exercises generally rather than focussing on the specific fire and rescue context.

Date issued: 11 December 2017