

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

Examiner Report on October 2018 Examinations

Introduction

Candidates generally performed well with good pass rates on the examinations in Fire Operations, Fire Safety and Management and Administration. Candidates appeared to have prepared well for these subjects. Pass rates for the Fire Operations examination and the Management and Administration examination exceeded the pass rates for March 2018 whilst the pass rate for the Fire Safety examination was in line with the pass rate for March.

Unfortunately, performance was poor on Fire Engineering Science with the pass rate dropping below the levels for March 2018 and 2017.

Fire Engineering Science (L3C1)

General

26% of candidates were successful in achieving a pass.

Multiple Choice Questions

Most candidates attained over half of the marks available for this element of the paper.

Questions addressing the mathematics section of the syllabus were often answered well. Candidates usually identified the correct responses for questions involving the calculation of capacity of a rectangular tank, a circular tank and a line of hose. They were also able to complete the ratio task and recognise the descriptive point relevant to a sphere. However, many were unable to calculate the length of the third side of a triangle in the scenario provided.

In relation to heat, few candidates recognised that water has the highest heat capacity but the other questions related to heat were often answered well.

In relation to hydraulics, many candidates were unable to complete the water power calculation correctly.

In relation to chemistry, errors were made in the recognition of turbulent diffusion flames and in the recognition of the description of fire point.

Short Written Answer Questions

The majority of candidates performed poorly on this section. Candidates should be aware that this is a Level 3 examination testing understanding of complex scientific concepts and processes. In order to attain marks in this element of the examination, candidates need to present information that is

precise and complete. Information provided by candidates was often incomplete and phrasing was often so vague that it was not possible for examiners to be confident that candidates had full understanding. Marks could only be awarded where precise scientific terms were provided and used correctly.

Candidates often appeared to be guessing at answers rather than drawing on relevant knowledge and understanding and the responses presented often omitted key information or contained basic errors. Many candidates failed to demonstrate understanding of basic concepts.

Density: Candidates were required to define the terms “density” and “relative density”. Few candidates provided correct definitions. Candidates should be aware that density is defined as the mass per unit volume of a substance. Some candidates appeared to guess at definitions. As many candidates were unclear about the nature of density, they were then unable to carry out the calculation of density required by part b) of the question.

Momentum: This question was often answered well with many candidates able to provide both the definition required by part a) and also complete the calculation required by part b) correctly. However, some candidates demonstrated a lack of precision in their responses to part a) as they cited the definition of momentum as being the product of mass and “speed” – precise definitions should have referenced velocity rather than speed.

Coefficient of linear expansion and critical temperature: Candidates were asked to explain the terms “coefficient of linear expansion” and “critical temperature.” Many candidates were unable to provide the precise explanations required.

Candidates should be aware that coefficient of linear expansion is the amount by which unit length of a solid expands when a temperature is raised by one degree Celsius. Many candidates made vague references to length without referring to one degree Celsius or explaining that the term was related to solids.

In explaining the term critical temperature, few candidates understood that this related only to gases and few provided sufficient precision in their responses to secure either of the marks available. Candidates should be aware that critical temperature is the temperature at which a gas cannot be liquefied by pressure alone.

Joule and Calorie: This question was the least well answered question on the examination paper. Although the terms are specified in the syllabus, few candidates appeared to be familiar with them. Many candidates defined the term “calorie” in relation to food rather than providing a precise scientific definition ie: A calorie is defined as the quantity of heat required to raise the temperature of 1 gram of water through 1°C.

Flow of water through a nozzle: The question asked candidates to explain what happens when water flows through a nozzle in terms of velocity and energy. Few candidates were able to explain that: the water flow contracts at the nozzle restriction and so the water velocity increases; the velocity increase is associated with an increase in kinetic energy; the total energy in the system remains the same; as the kinetic energy increases the pressure energy decreases.

Difference between compound and a mixture: In order to answer this question, candidates had to have a basic understanding of the concepts of “compound” and “mixture” in relation to chemistry. Unfortunately, few candidates appeared to have this understanding and this meant that many candidates attained few, if any, of the marks available for this question.

Extinguishing Media: This question was usually answered well with many candidates able to demonstrate sufficient understanding of the way in which water and foam are used to secure all five of the marks available.

Electricity: As in previous examinations, candidates often performed least well on this subject and many candidates omitted this question completely. Few candidates could define the term “volt”. 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.

Resistance of a circuit: Candidates were asked to identify three of the factors that affect the resistance of a circuit. Many candidates omitted this question or provided responses that were not appropriate. Candidates could have provided any three of the following four factors: the length of a conductor; the cross-sectional area of the conductor; the conductivity of the material used; temperature.

Fire Operations (L3C2)

General

Standards were good with 85% of candidates achieving a Pass.

Multiple Choice Questions

Many candidates were able to attain over half of the marks available for the multiple choice element of the questions.

As in previous examinations, candidates generally performed best on questions addressing incident command or firefighting and rescue procedures.

Questions addressing the technical aspects of equipment were often answered less well. Areas where candidates were least likely to identify the correct response were: causes of cavitation when pumping from an open water supply, use of branch pipes and the operation of carbon dioxide extinguishers.

Short Written Answer Questions

There were many good responses to this element of the question and some candidates attained high marks. Where candidates attained lower marks, this often appeared to be due to misreading of the question. Candidates are advised to read the questions carefully before responding.

Pre-planning for fire at an industrial site: Candidates who appreciated that the focus of the question was on pre-planning, were usually able to attain most, or all, of the marks available for this question. However, some candidates answered the question from the perspective of an incident commander tackling the incident and/or approaching the incident rather than from the perspective of advanced planning. Marks were, however, awarded where relevant. Candidates are advised to note that pre-planning is specifically identified in the syllabus.

Risk Assessments: This topic area appeared to be understood well and most candidates attained at least half of the marks available for this question.

Post-incident De-brief: This question was usually answered well. However, some candidates confused a de-brief with the process of handing over a scene after the incident had been closed down to the responsible person at the site of the incident.

Location of a fire on arrival at an incident: This question was usually answered well and most candidates attained full marks for their response

Extricating a casualty from a vehicle: This question was focussed specifically on the process of *extricating* a casualty from a vehicle. Candidates who addressed this specific issue were able to achieve most of the marks available. However, many candidates provided responses that focussed on wider issues such as stopping traffic in the vicinity and securing police support. The types of points that secured marks included: stabilise the vehicle, access the casualty e.g. by removing the door/roof of vehicle, control the movement of all obstructions to avoid aggravating any injuries, clear the area around the vehicle to enable safe route for transportation, ensure casualty's head, face and body are protected from further injury during extrication and that any medical equipment is secure.

Salvage operations: this question was usually answered well and most candidates attained full marks.

Poor water flow in mains: this question was often answered well. However, some candidates failed to appreciate that the question was focussed on "mains" and provided more general answers about water flow during firefighting operations.

Properties of firefighting foam: Candidates were asked to "describe" four of the properties of firefighting foam. The properties did not appear to be well known and few candidates could name or describe four of them. There are seven recognised properties ie: expansion, stability, fluidity, contamination resistance, sealing and re-sealing, knockdown and extinction and burnback resistance. Listing the properties did not secure a mark as a description was required eg burnback resistance - the ability of the finished foam, once formed on the fuel, to stay intact when subjected to heat and/or flame.

Purposes of BA guidelines: This question was often answered well. However, some candidates misread the question and wrote about the use of BA and/or procedures when donning BA.

Fire Safety (L3C3)

General

65% of candidates achieved a Pass.

Multiple Choice Questions

Few candidates attained high scores for the multiple choice element of the examination. Some topics appeared to be well understood eg the use of aluminium, types of sprinklers, types of drenchers, water supplies, principles of operation of inert gas firefighting installations. Unfortunately, many candidates were unable to demonstrate knowledge and understanding across the breadth of the syllabus. Areas where responses were particularly poor included the use of cavity walls, solid construction as a method of building construction, types of plastics and the use of optical alarms in detecting slow, smouldering fires.

Candidates generally performed best on questions which addressed the fixed installation section of the syllabus.

Short Written Answer Questions

Glass: Part a) of the question asked candidates to explain how glass is affected by fire. Most candidates identified that glass could lose its integrity and shatter. However, few went on to explain that it is non-combustible so does not act as fuel or that it transmits radiation so may act as a hazard/cause ignition of combustibles.

Part b) asked for examples of types of fire-resistant glass. Most candidates were able to attain at least one mark for this part of the question – the most commonly presented correct answer was wired glass. Examples of other types of glass that could have been referenced were: partially insulating glass products, insulating glass products, multi-laminate glass, heat-treated fire glass.

Fire doors: This question was generally answered well. In response to part a) most candidates were able to cite the two functions of a fire door as protecting escape routes enabling occupants to escape and protecting contents/structure by limiting the spread of fire.

Part b) asked candidates to identify two features of fire doors and explain how each feature contributes. Candidates sometimes listed features without fully answering the question in terms of the way each contributed. Where the question was not fully answered, the examiners were unable to award full marks.

Components of design of a sprinkler system: The question required a straightforward description of components such as pipes erected at or near the ceiling on each floor of a building, controlling valves connected to one or more water supplies, sealed outlets called sprinkler heads, devices whereby a rise in temperature to a pre-determined limit causes the sprinkler to open etc.

Candidates who focussed on the specific requirement of the question (ie components of the system) were able to attain most/all of the marks. However, some candidates did not attain marks as they provided irrelevant responses; for example, some wrote at length about different types of sprinkler systems whilst other focused on different types of bulb or sprinkler heads. Marks could be awarded only for relevant points so candidates who provided irrelevant responses did not attain marks.

Medium Velocity Water Spray Systems: Candidate who were familiar with medium velocity water spray systems were often able to attain most of the marks available for their description of the operation and effects of the system. Unfortunately, many candidates did not score marks for their response to this question as they confused medium velocity water spray systems with other water-based systems and wrote at length about systems such as water mist systems or drenchers.

Candidates should be aware that this system applies water in finely divided droplets travelling at medium velocity and is primarily a protective rather than extinguishing system. The effects produced are cooling, controlling and producing air turbulence in the vicinity of gas leakages.

Function of control unit on fire detection and alarm system. This question was usually answered well. There were six marks available for this question and most candidates were able to attain a high proportion (or all) of the marks available.

Time taken to evacuate a building: This question asked candidates to identify and explain two factors that have an effect on how long it takes for occupants to evacuate a building. Candidates usually identified two factors and secured half of the marks available; however, the failure to add the required explanation/depth to the response often meant that candidates were unable to secure the other marks available.

Reasons for carrying out a review of a risk assessment: Candidates were asked to identify five reasons for carrying out a review of a risk assessment. Few candidates identified more than one or two reasons. Reasons that could have been provided included: alternations to the building including internal layout, substantial changes to furniture and fixtures, introduction/change of use or increase in storage of hazardous substances, actual fire incident, significant increase in the number of people present and the presence of children or people with some form of disability for whom special arrangements may be necessary.

Management and Administration (L3C4)

General

Standards were high with 90% of candidates passing 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.

Short Written Answer Questions

As in previous examinations, candidates generally performed best on the questions focussed on people management (particularly those addressing communication and conflict management) and performed least well on the questions that addressed wider business issues such as risk management.

Business objectives: Candidates were asked to explain the importance of objectives for an organisation. Although candidates often identified the obvious issues such as clarity on priorities and shared goals, few considered the more detailed issues around measuring success, managing the allocation of resources and sharing responsibilities between different departments.

Risk management: Part a) of the question, which focussed on the importance of risk management, was often answered well. However, part b) was generally answered less well as few candidates appeared to be familiar with risk registers and appeared to be guessing in relation to the content of risk registers.

Some candidates confused risk registers with risk assessments and therefore failed to provide relevant information and did not secure marks.

Importance of communication: This question was usually answered well and nearly all candidates attained most (or all) of the marks available.

Conflict in the workplace: Most candidates were able to explain how conflict in the workplace can affect the performance of a team. There were many excellent responses to this question.

Delegation: Candidates generally demonstrated good understanding of the factors that affect the effectiveness of delegation.

Reasons that organisations hold information on their staff: Candidates were asked to identify three types of information that an organisation might hold on its staff and explain the reason to hold each type of information. Most candidates identified three types of information and secured at least three marks. However, some candidates omitted to explain the reason for holding the information and this therefore halved the amount of marks available to them.

On-the-Job Training: Part a) of the question asked candidates to explain what is meant by on-the-job training. Candidates often presented vague responses about training at work and omitted to explain that the training is relevant to an actual job role. Part b) was focussed on the advantages and disadvantages of this type of training. Candidates often identified three disadvantages but failed to find three relevant advantages.

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