

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

Examiner Report on March 2018 Examinations

Introduction

Candidate responses were generally of a high standard for all examination papers. It appeared that most candidates had prepared well for the examinations.

As in previous examination sessions, candidates performed best on the Management and Administration paper and on the Operations paper; they performed least well on the Fire Engineering Science paper.

Fire Engineering Science (L3C1)

General

51% 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. However, many candidates made errors in calculating the capacity of a length of hose; as in previous examinations candidates often made errors in working with different units of measurement (the length of hose was given in metres but the diameter was given in millimetres). Candidates are advised to pay particular attention of the use of different units. Candidates also made errors in recognising the formula for calculating the volume of a sphere. The question asking for the calculation of the angle of a triangle was answered particularly well.

Errors were made answering questions addressing the heat section of the syllabus. Many candidates were unable to recognise the definition of Charles' Law. Candidates also failed to recognise the definition of critical pressure; candidates should be aware that the pressure required to liquefy a vapour at its critical temperature is called the critical pressure.

The questions on hydraulics and chemistry were usually answered well.

The question on electricity was answered very poorly with few candidates recognising that when electrical components are connected end-to-end in a line to form a single path for electrons to flow this is known as a series circuit.

Short Written Answer Questions

There were many poor scripts and few candidates secured high marks for this section of the paper. Candidates should be aware that this is a Level 3 examination testing complex scientific understanding. In order to attain marks, candidates need to present information that is precise and complete. 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.

As in previous papers, candidates often performed least well on the questions testing knowledge and understanding relevant to electricity.

Power and Energy: This question was not answered well. Few candidates were able to explain that power is time-based and is related to how quickly a job is done whereas energy is ability to do work and the same tasks can be done at different rates (e.g. slowly and quickly). Some candidates secured marks for identifying the relevant units of measurement (ie power is measured in Watts and Energy is measured in Joules). However, few candidates secured all of the marks available for this question.

Vapour Density: Few candidates were able to define vapour density precisely. Candidates often provided vague and imprecise responses. In order to attain marks, candidates needed to explain that vapour density is given in relation to the density of an equal volume of hydrogen, air or oxygen under the same conditions of temperature and pressure. Candidates who did not reference the fact that “equal volume” and “same conditions” were required did not attain the marks available. Nearly all candidates gained at least one of the marks available for explaining why the density of gases and vapours is important in firefighting – however, some omitted to provide the example required by the question and therefore were unable to attain the additional mark available.

Absolute Zero: Most candidates recognised that Absolute Zero is the lowest point in temperature it is possible to achieve and it is measured on the Kelvin scale. Few candidates expanded this to explain that Absolute Zero is the point where molecules stop moving and it is not possible to cool the mass any further. Many candidates made errors in explaining the relationship between the Kelvin scale and the Centigrade scale. Candidates should be aware that $0\text{ k} = -273^{\circ}\text{C}$. Candidates frequently presented the relationship in reverse and some omitted to include the minus sign.

Few candidates recognised that this type of measurement is used when calculating how the volume of a gas changes with temperature and pressure.

Specific Heat Capacity: this concept should have been well understood but a surprising number of candidates were unable to explain what is meant by specific heat capacity. Candidates should be aware that specific heat capacity is the heat required to raise the temperature of one kilogram of the material by 1°C . An example of a substance with a high specific heat capacity is water.

There were many poor responses with a high number of candidates referring to specific heat capacity as the temperature at which a substance changed from one form to another and many others referring to it as being the point where a substance ignites.

Friction: The question asked candidates to describe the factors affecting loss of pressure in a hose due to friction. Many candidates wrote generally about factors affecting flow through a hose without focussing on the specific issues related to friction.

Extinguishing fire: This question focussed on the way that smothering and cooling methods can be used in extinguishing fire. Nearly all candidates secured at least half of the marks available for this question. Candidates who provided full explanations were able to secure all of the marks available.

Flashpoint: Few candidates were able to define the term “flashpoint”. Many candidates described flashover rather than flashpoint. Candidates should be aware that flashpoint is the lowest temperature at which there is sufficient vaporisation of the substance to produce a vapour which will flash across the surface when a source of ignition is applied.

Electricity: As in previous examinations, candidates often performed least well on this subject and many candidates omitted this question completely. Few candidates could define all three of the terms required by the question; definitions of the term “volt” were particularly poor.

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.

Fires in electrical installations: Most candidates could identify at least two potential causes of fire although few secured all of the marks available for the question.

Fire Operations (L3C2)

General

Standards were good with 83% of candidates achieving a Pass.

Multiple Choice Questions

Candidates generally performed best on questions addressing firefighting and rescue procedures with many demonstrating understanding best practice in different contexts.

Candidates often made errors when responding to questions requiring understanding related to appliances and equipment. Few candidates appreciated that a rotary pump is used for pumping water where the volume to be pumped is small and few recognised that the device used to check for background radiation is known as a survey meter. A surprising number of candidates failed to recognise that a portable dry powder extinguisher fitted with a low velocity applicator is designed primarily to deal with fires involving metals that combust easily on contact with air such as sodium, magnesium and aluminium.

Short Written Answer Questions

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

Sectorisation: Candidates were asked to explain what is meant by sectorisation. However, few candidates were able to give three examples of responsibilities of a sector commander – answers which could have been provided include managing resources in the sector, managing safety in the sector and delivering the objectives set by the incident commander for the sector.

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.

Some candidates wrote about hot and cold zones and some wrote out outer cordons.

Handing over an incident scene to the responsible person: Candidates who followed the instructions in the question and wrote about the process of handing over the incident scene were able to attain all/a high proportion of the marks. Some candidates omitted to consider the issues connected with “handing over” and wrote instead about closing down the incident and holding debriefs.

Candidates who focussed on handing over the scene usually referenced completion of relevant documentation and identification of remaining hazards. Few referenced the consideration of any fire protection/prevention issues for the future.

Definition of backdraught and signs of backdraught conditions: this question required technical understanding of backdraughts. Whilst some candidates attained high marks others appeared to have only limited understanding of the situation.

Rescues in confined spaces: This question was generally answered well with many candidates identifying key risks such as injuries due to trying to move in tight spaces, injuries due to casualty if casualty is unable to move/panics and loss of consciousness due to heat or gases.

Some candidates assumed that the context related only to sewers and focussed their answer only on this context rather than addressing the wider issue of confined spaces in general.

Fire in a waste plant: this question was often answered well and many candidates attained full marks for identification of relevant factors to be taken into account when tackling the fire.

Establishing BA control arrangements: this question was often answered well. However, some candidates wrote about donning BA rather than focussing on control arrangements. Candidates who considered issues such as location, meeting the needs of the incident, ensuring effective communications, ensuring appropriate area to carry out pre-entry checks etc attained high marks.

Use of thermal camera: many candidates attained full marks for identifying situations where thermal cameras may be used

Pitching Extension Ladders: Few candidates attained full marks for this question. Responses often failed to recognise the significant issues for consideration such as the potential dangers/obstructions above the area where the ladder is to be pitched and the need to ensure that crew members have undertaken appropriate training.

Fire Safety (L3C3)

General

65% of candidates achieved a Pass.

Multiple Choice Questions

Candidates generally performed best on questions which addressed elements of structure and fire safety practice. However, some candidates failed to recognise that laminated glass is a form of insulated glass and many failed to recognise that the encasement of steel structural members in a building by fire resistant board is known as hollow protection.

Candidates appeared to be less well prepared to answer questions related to fixed installations and alarm systems. Errors were made in responding to questions on types of sprinkler systems and types of form installations.

Candidates generally performed well on the questions addressing fire safety practice. However, a surprising number of candidates failed to recognise the description of compartmentation.

Short Written Answer Questions

Sandwich panels: Candidates were asked to provide a description of sandwich panels. Many candidates provided sufficient information to attain both of the marks available for the description but some responses were too vague to secure marks. Most candidates were able to identify at least two hazards presented by sandwich panels in a fire (usually referencing hidden fire spread, delamination of steel facing and/or production of black, toxic smoke) but few attained all four of the marks available; candidates often omitted to consider the potential collapse of the system and the fact that rapid fire spread could lead to flashover

Fire Retardant treatments for timber: The question asked candidates to describe two fire retardant treatments. Many candidates simply stated (or provided only a short sentence) related to surface coatings and impregnation. Although marks were obtained for identifying the two types, candidates who did not provide a fuller description were unable to attain the additional marks available.

Some candidates were able to identify only one type of treatment (usually surface coatings). Some wrote at length about sacrificial timber rather than focussing on fire retardant treatments.

Water mist systems: Few candidates demonstrated sufficient understanding of this type of system to secure all six of the marks available. Candidates often confused water mist systems with sprinkler systems.

Candidates were usually able to explain the effects of water generally but did not focus specifically on water mist systems – this approach limited the marks that could be attained. There were many points that could have been made in relation to the delivery of water via a network of pipes, the small supply of water generating finely divided droplets and the way that mist behaves as vapour and is drawn towards areas otherwise inaccessible by the airflows created by a fire.

Benefits of SHEVs: Most candidates were able to attain at least half of the marks available for this question. Candidates often identified the benefits in relation to escape and firefighting but failed to

consider the benefits in relation to reducing smoke damage and the reducing the effect of heat on structure.

Smoke Detectors: Few candidates were able to fully describe the operation of either an ionising smoke detector or an optical smoke detector. There were six marks available for this question but few candidates attained more than two marks.

Reducing false alarms: This question was generally answered well and many candidates were able to identify three relevant actions to reduce false alarms as required by the question.

Refuges: Candidates who understood that a refuge is a place of reasonable safety in which a disabled person or others who may need assistance may rest or wait were able to attain either all or a high proportion of the six marks available for this question. However, many candidates provided only a partial explanation of a refuge; for example, some omitted to explain that is a place of “reasonable safety” whilst others omitted to consider the need for assistance. Candidates who did not recognise the purpose of a refuge were unable to identify design features such as a need to ensure access for wheelchairs. Many candidates failed to identify basic features such as the need for the refuge to lead directly to an escape route.

A surprising number of candidates confused refuges with assembly points and wrote at length about meeting points at a safe distance from the incident.

Management and Administration (L3C4)

General

Standards were high with 81% 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.

Most candidates appeared to have some understanding of all areas of the syllabus. The main areas of weakness appeared to be understanding of functional management and understanding of the benefits of carrying out a training needs analysis. Less than half of the candidates were able to identify an example of a SMART learning objective.

Short Written Answer Questions

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 different types of plans used in businesses.

Plans used by a business: Candidates were asked to identify and describe two types of plans used by organisations and to explain how each type of plan contributed to business success. Most candidates successfully identified two types of plan. The types of plans mentioned most often were strategy, training (and development) and financial/budget. Few candidates mentioned business plans. Candidates generally provided sufficient description of the plan. However, few explained

how the plans contributed to business success so few candidates were able to attain all of the marks available for this question.

Several candidates did not appear to understand planning and described different types of structural model instead of types of plans eg functional, matrix etc. Some candidates illustrated their answers by drawing organisational charts. This information did not answer the question and these candidates did not attain any of the marks available.

Frontline Managers and HR Managers: This question was generally answered well and many candidates attained all four of the marks available. Nearly all candidates were able to identify two occasions when a frontline manager would work with the HR manager (the most common examples provided were recruitment, disciplinary procedures and grievance procedures).

Some candidates were unclear about differences between the role of the HR manager and the role of the frontline manager. Most candidates provided a basic description of each role but many did not include sufficient information to attain all of the marks available – few candidates referenced that the HR Manger works across the whole organisation whilst the frontline manager worked within one team/department. Some candidates presented their response in relation to a hierarchy and suggested either that the HR manager reports to the line manager or that the line manager reports to HR.

Requirements for an effective disciplinary procedure: Many candidates described the stages of a disciplinary process rather than focussing on the factors that affected the effectiveness of a disciplinary procedure – having a staged process in place is one these factors. Candidates who attained high marks referred to other factors in addition to the process such as:

- The disciplinary system should be published and made available to everyone so that all individuals are aware of the company requirements and the processes that will be followed if there are infringements to the rules.
- Individuals should show the standards of performance that they are expected to achieve.
- Procedure set out that will be followed – clear steps
- All staff should have confidence that the system will be implemented and followed as set out in the procedure
- Timely – carried out within an appropriate and clear timescale

Importance of addressing poor performance: This question was usually answered well and nearly all candidates attained a high proportion of the marks available.

Autocratic Management style: This question was generally answered well. However, some candidates confused autocratic with democratic management and provided inappropriate responses.

Reasons that organisations hold information on their staff: many candidates failed to address the requirements of this question. Candidates were asked to explain why it is important for organisations to hold up to date information on their staff. Candidates often omitted to address the actual requirements of the question and provided responses that listed information that might be held without saying why it was needed; some candidates focussed on features of systems such as confidentiality. Candidates who referenced points such as the need to contact next of kin in an emergency, the need to ensure that refresher training was up to date, the need to made sure that staff were paid the right amount were able to attain the marks available.

Contribution of the chair to a meeting: Most candidates attained marks for identifying the role of the chair in keeping the meeting on track and in ensuring that attendees were provided with the opportunity to participate. Some candidates assumed (incorrectly) that the chair of a meeting would also provide the secretariat function eg circulating agendas and writing up the notes.

Advantages and Disadvantages of e-learning: This question was usually answered well. Most candidates attained at least some of the marks available and many candidates secured all six of the marks.

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