2395-302 Level 3 Principles, Practices and Legislation for the Periodic Inspection, Testing and Condition Reporting of Electrical Installations.

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Chief Examiner's report – December 2014

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1 Introduction

The purpose of this document is to provide centres with feedback on the performance of candidates in the December 2014 examination for 2395-302 Level 3 Principles, Practices and Legislation for the Periodic Inspection, Testing and Condition Reporting of Electrical Installations.

The Chief Examiners' Report has been reintroduced as a result of feedback from centres, to give them guidance in preparing candidates for the written examination.

2 Feedback on candidate performance

General feedback

The following comments are intended to help students prepare for the examination by having a better understanding of what is expected of them. The feedback within this report would also be valuable to tutors in understanding candidates' difficulties in answering questions and the areas where more guidance is required.

The December 2014 series question paper was found to be in accordance with the scheme requirements.

Candidates appeared to have no issues with the paper format. They need to be aware that the space left for their answer is intended to be generous and, in almost all cases, is more than enough to record their answer.

Candidates should keep their responses within the allotted area and any additional sheets should be stapled to the back of the answer book. Any additional sheets should be completed on plain lined paper and not in a second answer book. The blank pages at the back of the answer book should not be used for candidate responses as these are not allocated areas for the marking and so are not included in the scanned marking allocation.

Where it becomes necessary for centres to copy/print additional answer books these should be produced double sided to facilitate correct scanning into the marking software.

Candidates and centres should be mindful that this qualification relates to the periodic inspection of electrical installations. It was evident from answers provided by some candidates that they had little experience or understanding of the requirements for periodic inspection. It was further apparent from some of the supplementary information given in the candidates' responses that many were referencing initial verification requirements.

The requirements of periodic inspection and the actions to be taken by the inspector in given situations and the information which is recorded on the report presented problems for a large number of candidates. These areas of the periodic inspection process require a better understanding than is currently being demonstrated. Centres may wish to review the extent to which this is covered in their course presentation.

From the information provided by candidates it appears that, whilst they may be aware of the need for inspection, they had little understanding of what needs to be inspected and why the inspection is required. A large number of candidates when answering questions related to inspection gave responses related to testing and test results and not to inspection items or requirements. A large number of candidates failed to address the specific items identified in the question when describing inspection items. Many responses indicated that the candidate was not aware of the requirements of periodic inspection in relation to the fixed wiring and containment systems.

Candidates should be aware that the Schedule of Inspections for the periodic inspection of electrical installations given in Guidance Note 3 provides detailed information on the items of inspection for these installations. Further guidance is given in Appendix 6 of BS 7671 for installations with a supply exceeding 100 A. Candidates becoming familiar with the items they are to consider, inspect and record the outcome will greatly improve both their understanding of the inspection process and their success in any related questions.

It was also apparent that candidates were not reading the question carefully and so not producing appropriate answers. Some candidates gave responses which did not relate to the question asked or provided generic answers some of which were not appropriate.

These types of responses indicate that the candidates were either not in possession of suitable knowledge or have failed to consider and understand the requirements of the questions.

Candidates should also be aware that where questions carry high marks these require a more detailed response, for example a three word statement is not going to achieve 10 marks.

The candidates should be aware of the requirement to show calculations and descriptions to demonstrate their conclusions when answering questions. It is also important that candidates include the correct units for the answers produced from their calculations e.g. Ω, mΩ, A, kA, ms etc.

Candidates need to read the questions carefully as failure to do so produces incorrect responses, this includes some simple errors such as stating describing tests for a single phase system when a three phase system has been identified in the question or scenario.

Knowledge of BS 7671 and Guidance Note 3

There were a number of candidates who were unable to correctly name the documents which are completed and handed to the client on completion of a periodic inspection and test.

Where candidates were asked to list items of information which should be included on the diagrams and charts provided by the client to the inspector a large number of candidates listed supply characteristics. It would appear that candidates are either unaware of the information contained on the charts or failed to read the question fully.

Many candidates were unable to state what is meant by the extent and the limitations which are agreed before the work commences. Candidates confused the two terms and very few clearly explained what each referred to. As it is a requirement to confirm these with the client candidates should be aware of what they relate to. The reasons given for the extent and limitations being agreed before work commenced also revealed a lack of understanding. A large number of candidates incorrectly stated that is to avoid disruption, shut down or inconvenience.

When asked what action should be taken if an agreed inspection or test item could not be carried out on site few candidates were able to identify the need to record this together with the reason, in the operational limitations section of the report. Many referred to applying observations and classification codes, which are not appropriate for this situation.

When asked to state considerations that should be made when determining whether a sampled inspection and test was appropriate many candidates incorrectly identified supply characteristics and/or test results.

Many candidates were unable to explain, using information provided in the question and scenario, why prospective fault current would not need to be measured at remote distribution boards. The fact that the Pfc measured at the origin was lower than the I_{cn} of the circuit breakers installed in the remote distribution boards and that the fault current would be lower further away from the origin was missed by many. The most common incorrect answers included that, Pfc is only measured at the origin, previous test results are available and because main bonding is in place.

One question asked candidates to describe, with the aid of a fully labelled diagram, the earth fault path for a given circuit. The responses to this question were disappointing with candidates describing the wrong system, failing to earth the transformer and showing the fault current going to

earth at the transformer. For those who drew a correct earth fault path the labelling was often poor and consequently candidates lost marks for this question. Candidates would be well advised to consider the sample answers to this type of question shown in the City and Guilds Exam Success Book. Those candidates who were familiar with the exam success book sample answers generally scored well.

Test Equipment

Candidates were asked questions relating to safe isolation and a prospective fault current test. A number of candidates were unable to correctly identify the instruments used for one or both of these activities. A common incorrect answer being to use an earth fault loop impedance tester to measure Pfc, without stating it is set to prospective fault current. Candidates should be aware that the instruments to be identified are those specific to the test in question.

Inspection

The requirements for inspection continue to be a major problem for candidates taking this examination.

Whilst the majority of candidates appeared to be familiar with the basic testing requirements it was the specific requirements of periodic inspection which caused them problems.

Common errors relate to inspection items which require dismantling or cannot be accessed, for example the cables within conduit, cable condition, space factor, presence of sharp edges etc. It is a standard limitation of the model forms in BS 7671 that cables contained within the building structure and within containment systems are excluded from the inspection. Furthermore BS 7671 requires that periodic inspection and testing is carried out with as little taking apart or dismantling as possible. Therefore items which require the dismantling of the containment system in order to inspect should not be included.

The requirements specifically related to the inspection of an electrical installation were a further area of considerable misunderstanding. It appears that the requirements of inspection (that is the inspection items and what they are inspected for) is an area which requires more attention during the related course delivery. This area is important to ensure that candidates have the knowledge required to both carry out an inspection and maximise their chances of success in the examination. Centres may wish to review the extent to which the inspection is covered during their course presentation.

Candidates were asked to identify items to be checked during the inspection of a black enamelled conduit system. Many candidates included items such as 'earthing' in general, cables and conductors, terminations and accessories which are not part of the containment system.

Testing

The requirements for testing during periodic inspection and test are different to those required at initial verification.

A large number of candidates were unable to identify the tests which needed to be undertaken with the complete installation isolated from the supply. As the question excluded the insulation resistance of the complete installation there were only two correct answers, Z_e and continuity of main protective bonding conductors.

Candidates were asked to describe the test required to confirm safe isolation of the whole installation at the origin. Many candidates failed to identify the test would be carried out on the load side of the isolator and that 0V would be the required measurement to confirm isolation. A

number of candidates failed to relate the question to the scenario and incorrectly described isolation of a single phase installation.

Candidates were asked to describe the process for carrying out a prospective fault current test at the main isolator at the origin of a three-phase installation. A number of candidates incorrectly indicated that the earthing and/or main protective bonding conductors would be disconnected for this test.

A considerable number of candidates failed to identify that this was a three-phase installation and described a single phase test. A surprising number of candidates only described tests between line conductors and earth with no other tests. On a three phase system the test to earth is not required as the highest Pfc will be between live conductors and the test is either direct between lines and the highest recorded or between lines and neutral and the highest multiplied by two is recorded.

3 National pass rate

The national pass rate for the 2395-302 December 2014 examination is as follows:

Exam series	Pass rate (%)	Fail rate (%)
December 2014	**52**	**48**

Past examination series

Exam series	Pass rate (%)	Fail rate (%)
October 2014	**54**	**46**
August 2014	**59**	**41**
June 2014	**63**	**37**
April 2014	**49**	**51**
February 2014	**55**	**45**

Forthcoming Exam Dates are:

Wed 11 February 2015
Wed 22 April 2015
Wed 10 June 2015

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