

SOUTHERN AFRICAN EMERGENCY SERVICES INSTITUTE.

QUESTION BANK FOR: HIGHER CERTIFICATE - FIRE SAFETY 300 (FST300)

1. REQUIRED STUDY MATERIAL:

- Success Study Material – Book 1 of 1 - Fire Safety 3
- SANS 10400: Part A - 2010
- SANS 10400: Part T - 2011
- SANS 10400: Part W - 2011
- SANS 10087: Part 1 - 2013
- SANS 10087: Part 3 - 2008
- SANS 10087: Part 7 - 2013
- SANS 10087: Part 10 - 2012
- SANS 10089: Part 1 - 2008
- SANS 10089: Part 2 - 2007
- SANS 10089: Part 3 - 2010
- SANS 10131 - 2004

2. ADDITIONAL STUDY MATERIAL

- None

3. QUESTIONS

- Questions MUST be read carefully to ensure clear understanding of the concept and/or content and apply them as such in your answers, for example:

◆	Describe:	Name the characteristics of something (a happening, object, method or subject).
◆	Define:	Give a concise description of the subject.
◆	Discuss:	Give a complete description of the subject.
◆	Give:	Write down names, facts, items, advantages and/or disadvantages. <u>Do not discuss.</u>
◆	List:	Write down names, facts, items, etc. In a specific order or according to specified categories.
◆	Name:	Write down names, characteristics, dates, items, components or facts.
◆	Draw:	Dot out, draw lines, sketch or formulate in graphic form (e.g. a drawing).
◆	Explain:	Make something more clearly for example by using illustrations, descriptions, examples and/or comparisons.

4. Study material and revision questions contained in the Success Manuals and SABS Codes of Practice (Relevant edition) is of vital importance, as it contributes to 100% of the questions.
5. Question paper is a three (3) hour paper and consisting of Six (6) and ALL of them must be answered.
6. All questions add to a total of twenty (20) marks per question with a total of hundred and twenty marks (120) marks for the whole paper.
7. Students are advised to attempt all assignments and questions in the study material to obtain more knowledge on the subject.
8. Please indicate on the front cover of your answer book the questions answered. Ensure that you have answered the correct number of questions. If there is questions that must not be marked, please put a line through such answer.

9. There is no required length or limit for your answers, unless it is stated so e.g. “an acceptable format”. Questions can be sufficiently answered in less space, and it is okay to go over, if you think it improves the response. Keep in mind, however, that a lengthier answer is not necessarily a better one.
10. You have an average of thirty (30) minutes for each question. Though grammar and style will not be a major factor in your grade, there should be a reasonable degree of organization and clarity. It is advisable to spend a few minutes planning your response, possibly even jotting down a very simple outline, rather than simply writing off the top of your head. (You may write notes on your answer book)

TAKE NOTE THAT THE “QUESTION GENERATOR” WILL RANDOMLY SELECT SIX (6) QUESTIONS OUT OF THIS SEVENTY FIVE (75) TO GENERATE THE RESPECTIVE QUESTION PAPER.

QUESTIONS

1. With reference to building terminology, define the following:

(i)	Balustrade	(1)
(ii)	Balcony	(1)
(iii)	Basement	(1)
(iv)	Cavity wall	(1)
(v)	Deflection	(1)
(vi)	Fire barrier	(1)
(vii)	Partition	(1)
(viii)	Queens post	(1)
(ix)	Tie beam	(1)
(x)	Truss	(1)
(xi)	Valley	(1)
(xii)	Ridge	(1)
(xiii)	Lintel	(1)
(xiv)	Lobby	(1)
(xv)	Gunite	(1)
(xvi)	Header	(1)
(xvii)	Hip	(1)
(xviii)	Footing	(1)
(xix)	Gable	(1)
(xx)	Cantilever	(1)

2. (a) Define the following:

(i)	Torching	(2)
(ii)	Quoin	(2)
(iii)	Shuttering	(2)
(iv)	Skewbacks	(2)
(v)	Stud	(2)

(b) What is a chimney breast? (5)

(c) With reference to chimneys explain “parging” which is sometimes referred to as “pargetting”? (5)

3. (a) With reference to construction of stairs, sketch and label the typical outline plan shapes? (10)

- (b) With reference to construction of buildings and shafts, what is a protected structure? (5)
- (c) Explain in detail what is a hearth? (5)
-
4. (a) With reference to building construction, define the following terminology:
- (i) Basement (2)
 - (ii) Dead end (2)
 - (iii) Fire barrier (2)
 - (iv) Bearing wall (2)
 - (v) Wind load (2)
- (b) List ten (10) types of building collapse. (10)
-
5. (a) With reference to building construction, define the following terminology:
- (i) Fire lobby. (2)
 - (ii) Load bearing wall. (2)
 - (iii) Going. (2)
 - (iv) Noggin. (2)
 - (v) Truss. (2)
- (b) Discuss the hazards associated with roof trusses that could be identified during pre-fire planning. (10)
-
6. With regards to building terminology, define the following:
- (i) Flitched Beam (2)
 - (ii) Fish Plate (2)
 - (iii) Kyanise (2)
 - (iv) Pickling (2)
 - (v) Shore (2)
 - (vi) Witches (2)
 - (vii) Mezzanine (2)
 - (viii) Nogging (2)
 - (ix) Luminous Paint (2)
 - (x) Parapet (2)
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7. (a) List the two (2) main types of ceilings. (2)
- (b) List three (3) types of suspended ceilings. (3)
- (c) List four (4) support systems for ceilings. (4)
- (d) What is a laminated beam? (3)
- (e) Describe a box beam. (2)
- (f) What are the reasons for truss collapse? (6)
-

8. (a) Explain double timber floors. (3)
- (b) With reference to structural floors, state whether the following are true or false.
- (i) Ground floors are supposed to withstand the loads that will be imposed upon them. (1)
 - (ii) Promote growth of vegetation inside the building. (1)
 - (iii) Assist in dampness and moisture to penetrate by inserting a damp proof membrane in or below the floor. (1)
 - (iv) Meet the prescribed width standards. (1)
 - (v) To be durable and reduce the amount of maintenance work. (1)
 - (vi) Provide an acceptable surface finish to meet the occupants comfort requirements. (1)
 - (vii) Where the upper floor should be able to restrict the vertical passage of fire. (1)
- (c) With reference to roof types, name the following:
- (i) Used on all kinds of buildings and has a slight lean for drainage. (1)
 - (ii) A roof that slopes in one direction only. (1)
 - (iii) A roof that slopes in two different directions. (1)
 - (iv) Two roofs together which meet at a low point. (1)
 - (v) A roof that slopes in four directions. (1)
 - (vi) A roof that slopes in two directions but has a change of slope on both sides. (1)
 - (vii) This type of roof has a double slope on all four sides. (1)
 - (viii) This roof is used in industrial buildings to facilitate ventilation. (1)
 - (ix) A curved shaped roof almost like a semi circle. (1)
 - (x) A pitched roof with a further point on the top of it for ventilation. (1)
-
9. (a) List and draw ten different roof styles. (10)
- (b) What are pre-stressed floors? (5)
- (c) What is meant by post tensioning with reference to concreting. (5)
-
10. With reference to building construction explain the following:
- (i) Building collapse. (2)
 - (ii) Secondary collapse. (3)

- | | | |
|--|-----------------------------------|-----|
| | (iii) Ninety degree collapse | (2) |
| | (iv) Inward outward collapse. | (3) |
| | (v) Lean to floor collapse. | (3) |
| | (vi) Pancake collapse. | (2) |
| | (vii) Curtain fall wall collapse. | (3) |
| | (viii) Tent floor collapse. | (2) |
-
11. (a) Explain the term fire load. (5)
- (b) What is static fire protection? (2)
- (c) What is dynamic fire protection? (3)
- (d) List and draw ten (10) different truss styles. (10)
-
12. With reference to building construction, discuss the following:
- | | | |
|--|----------------------------|-----|
| | (i) Bearing wall | (4) |
| | (ii) Fire wall | (4) |
| | (iii) Free - Standing wall | (4) |
| | (iv) Parapet wall | (4) |
| | (v) Party wall | (4) |
-
13. With reference to building construction:
- | | | |
|--|--|------|
| | (i) List ten (10) types of materials commonly used for roof covering | (10) |
| | (ii) List ten (10) types of roof styles. | (10) |
-
14. (a) List the basic function of a roof and its major concerns to fire fighters. (6)
- (b) List seven (7) types of roofs and give a brief description of each. (14)
-
15. With reference to building construction:
- | | | |
|-----|---|------|
| (a) | What are the functional requirements of upper floors? | (10) |
| (b) | Describe the composition of concrete. | (5) |
| (c) | Describe the composition of aggregates. | (5) |
-
16. (a) List the basic function of a floor and its major concern to fire fighters. (4)
- (b) List the functional requirements of floors under the headings-
- | | | |
|--|------------------|-----|
| | (i) Ground floor | (5) |
| | (ii) Upper floor | (5) |
- (c) List six (6) types of floors. (6)
-

17. With reference to ceilings:
- (a) List the two (2) main types of ceilings. (2)
 - (b) List three (3) types of suspended ceilings. (3)
 - (c) List four (4) support systems for ceilings. (4)
 - (d) Explain the complication and possible solutions to the installation of suspended ceilings. (11)
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18. With reference to building construction:
- (a) What are the functions of a column? (5)
 - (b) List three (3) types of columns. (3)
 - (c) Give six (6) functions of ground floors. (6)
 - (d) Give six (6) functions of upper floors. (6)
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19. With reference to ventilation:
- (a) Name five (5) advantages of forced ventilation. (5)
 - (b) Name five (5) disadvantages of forced ventilation. (5)
 - (c) Positive pressure ventilation has some distinct advantages over natural and forced ventilation, name five (5) of the advantages. (10)
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20. (a) During evaluation of an incident for ventilation, it must be determined if there is a need for ventilation or not. List the most important considerations. (10)
- (b) Describe the procedures for ventilation of a basement. (5)
 - (c) Describe the procedures for ventilation of attics/cocklofts and the difference between attics/cocklofts and basements. (5)
-
21. Discuss ventilation and aggressive interior fire suppression. (20)
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22. Explain under the following headings what needs to be taken into account when evaluating an incident for ventilation.
- (i) Is there a need for ventilation? (10)
 - (ii) Where is ventilation needed? (5)
 - (iii) What type of ventilation should be used? (5)
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23. Elaborate why vertical ventilation is said to be the most effective form of ventilation. (20)
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24. What are some of the considerations that must be taken into account when effecting top ventilation? (20)
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25. With reference to ventilation:
- (a) On what type of structures is horizontal ventilation applied on. (10)
 - (b) What would you consider when effecting horizontal ventilation? (10)
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26. What additional safety precautions would you take into account when conducting ventilation? (20)
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27. Discuss ventilation in multi storey and high rise structures. (20)
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28. With reference to Fixed Fire Installations, describe the following:
- (i) Total flooding (5)
 - (ii) Local Application (5)
 - (iii) Extended discharge (5)
 - (iv) General safety precautions where fixed carbon di-oxide installations are installed. (5)
-
29. With reference to fixed installations and application systems
- (a) What are projectors? (10)
 - (b) List the properties of carbon dioxide as an extinguishing agent. (5)
 - (c) Discuss the limitations of carbon dioxide as an extinguishing agent. (5)
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30. What consideration would you take into account when selecting a fixed installation system? (20)
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31. (a) List five (5) types of fixed fire protection systems. (5)
- (b) List the maintenance, inspection and test procedures for carbon dioxide installations. (15)
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32. With reference to Fixed Fire Installations, describe the following:
- (i) Total flooding. (5)
 - (ii) Local Application. (5)
 - (iii) Extended discharge. (5)
 - (iv) General safety precautions where fixed carbon di-oxide installations are installed. (5)
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33. (a) Draw and label a Fidela detector under fire and non-fire conditions. (10)

- (b) Explain the theory and practice of the working of this type of detector. (10)
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34. (a) Draw and label an ultra violet type detector during fire and non fire conditions? (10)
- (b) Describe the practice at which the above detector operates? (10)
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35. With reference to automatic type fire detectors:
- (a) Draw and label a light scatter typed detector during non-fire and fire conditions. (10)
- (b) Explain the theory and practice of this type of detector. (10)
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36. With reference to heat detectors:
- (a) Draw and label a Dimac type detector during fire and non fire conditions. (10)
- (b) Explain the theory and practice of their workings. (10)
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37. (a) List the basic components and explain the “theory” of an optical light-scatter type smoke detector. (8)
- (b) Illustrate the operation of an infra-red beam detector, with the aid of a sketch. (6)
- (c) List six (6) types of detectors that are covered in the study material. (6)
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38. Sketch and describe the functioning of an optical smoke detector (Obscuration type) during fire- and non-fire conditions. (20)
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39. (a) List the components of an Infra-red radiation detector. (6)
- (b) Explain the principles of expansion in heat detectors with regard to:
- (i) Single metal strip. (5)
- (ii) Bi-metal strips. (6)
- (iii) Sketch a basic illustration of the effects of heat on bi-metal strip. (3)
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40. (a) Draw and label a ionization detector under fire and non - fire conditions (10)
- (b) Explain the theory and practice of the working of this type of detector. (10)
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41. (a) With reference to SANS 10400-A: 2011, complete the following definitions:
- (i) Chemical closet (1)
- (ii) Cleaning eye (1)
- (iii) Communication pipe (1)
- (iv) Competent person (1)
- (v) rational design (1)

- (vi) rational assessment (4)
 - (vii) contaminated land (1)
 - (viii) fire resistance (2)
 - (ix) prescriptive regulation (3)
 - (x) public place (5)
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42. With reference to SANS 10400-T: 2011:

- (a) List the safety requirements for the installation of hose reels. (5)
 - (b) Explain the safety requirements where lobbies, foyers and vestibules form a component of an escape route. (5)
 - (c) Describe the requirements for the provision of emergency lighting. (5)
 - (d) What are the marking and signposting requirements for escape routes? (5)
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43. With reference to SANS 10400-A: 2011:

- (a) What is meant by a geotechnical site investigation? (10)
 - (b) List ten (10) examples of minor building work. (10)
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44. With reference to SANS 10400-T: 2011:

- (a) Elaborate on access for fire fighting and rescue purposes. (5)
 - (b) List the requirements for a mobile fire extinguisher. (5)
 - (c) What are the functional requirements of a fire damper? (5)
 - (d) Give the safety requirements for operating theatres and intensive, high or critical care units. (5)
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45. With reference to SANS 10400-A: 2011,

- (a) Define the following:
 - (i) A1 (1)
 - (ii) A2 (1)
 - (iii) A5 (1)
 - (iv) B1 (1)
 - (v) B3 (1)
 - (vi) C1 (1)
 - (vii) C2 (1)
 - (viii) D1 (1)
 - (ix) D2 (1)
 - (x) E1 (1)
 - (b) Explain “general enforcement” for the use of any building as contemplated in the above code. (10)
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46. With reference to SANS 10400-A: 2011:

- (a) Any person intending to erect any building shall submit plans to the local authority. List five (5) plans as required. (5)
 - (b) Specific colours are utilized to indicate specific work on building plans. List the work according to the listed colours:
 - (i) Red (1)
 - (ii) Green (1)
 - (iii) Blue (1)
 - (iv) Yellow (1)
 - (v) Black (1)
 - (c) Any site plan shall fully and clearly contain certain information. List the information required. (10)
-

47. With reference to SANS 10400-A: 2011:

- (a) Symbols on fire protection plans list the detail of the following symbols as contained:
 - (i) FE (1)
 - (ii) FH (1)
 - (iii) FI (1)
 - (iv) FM (1)
 - (v) FPC (1)
 - (vi) FS (1)
 - (vii) HD (1)
 - (viii) HR (1)
 - (ix) RM (1)
 - (x) RV (1)
 - (xi) SD (1)
 - (xii) SS (1)
 - (xiii) SX (1)
 - (xiv) V (1)
 - (b) Classification and designation of occupancies all buildings or parts of buildings are indicated by occupancy classifications. Briefly explain the process and provisions. (6)
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48. With reference to SANS 10400-T: 2011:

List the fire protection requirements in terms of Regulation T1. (20)

49. With reference to SANS 10400-T: 2011:

- (a) Fire resistance of external walls list the three (3) types of external wall. (3)
 - (b) Briefly explain the concept of determining safety distances according to table 2 of deem to satisfy rule 4.2. (5)
 - (c) List the requirements for the subdivision of roof space. (12)
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50. With reference to SANS 10400-T: 2011:
- (a) List the requirements for the installation of hose reels in any structure for firefighting purposes. (8)
 - (b) List the requirements for fire detection and alarm systems. (12)
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51. (a) With reference to SANS 10400-A: 2011, symbols are used on building plans to indicate the fire equipment. Describe the following symbols:
- (i) FPC (2)
 - (ii) SD (2)
 - (iii) HR (2)
 - (iv) FE (2)
 - (v) FM (2)
- (b) With reference to SANS 10400-T: 2011, define the following:
- (i) Non-combustible. (2)
 - (ii) Sprinkler system. (2)
 - (iii) Pressurization. (2)
 - (iv) Division wall. (2)
 - (v) Artificial ventilation. (2)
-
52. With reference to SANS 10400-T: 2011:
- (a) Discuss the lighting requirements in emergency routes. (12)
 - (b) List the "deem-to-satisfy" rules for fire hydrants as prescribed in 4.35. (8)
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53. (a) With reference to SANS 10400-T: 2011, define the following:
- (i) Fire-stop (2)
 - (ii) Fire load (2)
 - (iii) Occupancy (2)
 - (iv) Competent person (2)
 - (v) Pressurization (2)
- (b) With reference to SANS 10400-A: 2010, list the building work that is regarded as "minor building work" and provide the relevant dimensions. (10)
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54. (a) With reference to SANS 10400-T: 2011, define the following:
- (i) Fire door (2)
 - (ii) Emergency route (2)
 - (iii) Stairways (2)
- (b) With reference to SANS 10400-T: 2011:
- (i) Give the requirements for the ventilation of stairways in an emergency route. (6)
 - (ii) List the requirements for pressurization of stairways in an emergency route. (8)
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55. With reference to SANS 10400-T: 2011, what are the requirements for a fireman's lift. (20)

56. With reference to SANS 10400-A: 2011:

(a) Any person intending to erect any building shall submit to the local authority the following plans and particulars, together with the application:

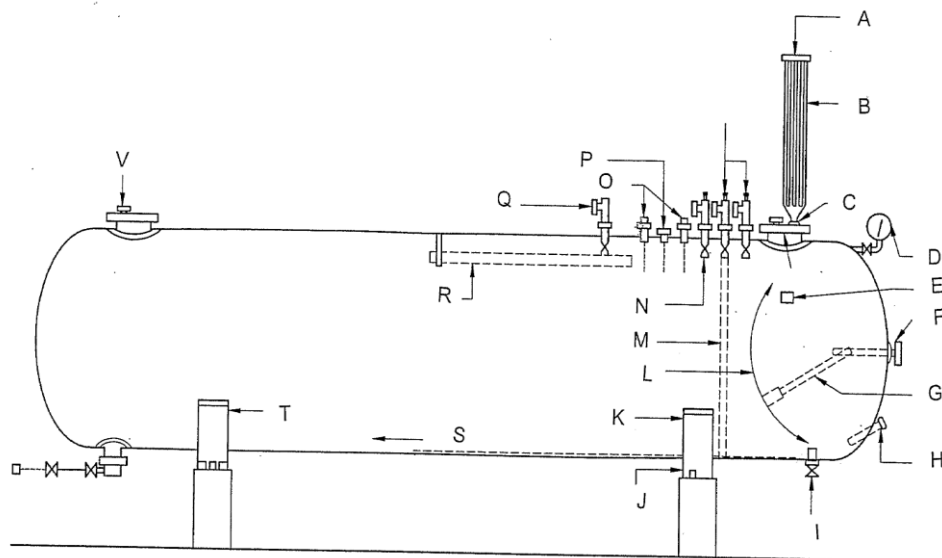
List five (5) of plans and/or particulars that must be submitted. (5)

(b) Name the material and list the colour of the plans and drawings as contemplated in sub regulation (2). (10)

(c) List the symbols of the following:

- (i) Fire extinguisher (1)
 - (ii) Fire Hydrant (1)
 - (iii) Fire pump connection (1)
 - (iv) Reflux valve (1)
 - (v) Smoke extractor (1)
-

57. With reference to SANS 10087-3: 2008, label the diagram below. (20)

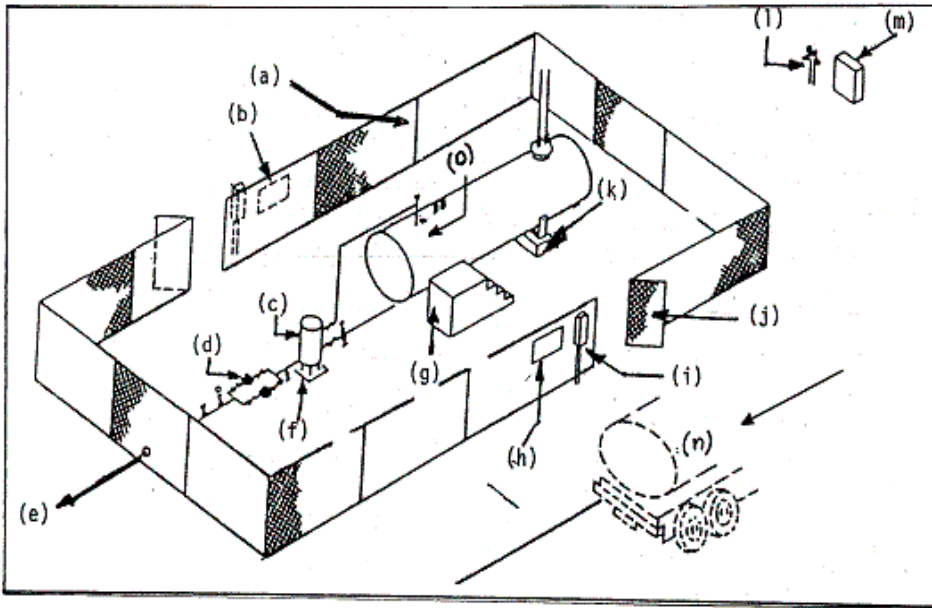


SANS 10087-3:2008
Edition 4

Figure 1 — Typical above-ground LPG storage vessel (side view)

58. With reference to SANS 10087-3:2008:

- (a) Complete the names of alphabets “A” to “O” as Depicted on the supplied diagram. (15)



- (b) Name five (5) ways that one can guard against inductive sparking? (5)

59. (a) With reference to SANS 10087-3: 2008, what competencies must a person have before being allowed to fill a storage vessel with gas? (10)

- (b) With reference to SANS 10087-10: 2012, state the safety requirements for trailers used for transporting LPG containers. (10)

60. With reference to SANS 10087-1: 2013, regarding number, size and location of LPG containers:

- (a) List the criteria that determine the number and size of cylinders. (3)
- (b) Give the recommended size and amount of cylinders for ordinary installations in permanent dwellings. (4)
- (c) List the general requirements for container location. (7)
- (d) List the locations that should be avoided with placement. (6)

61. (a) Indicate if the following information pertaining to SANS 10087-7: 2013 is true or false. Indicate the question number and your choice of true or false on the answer sheet.

Example – i) true ii) false

- (i) Storage of L.P. gas cylinders may be stacked / stored inside any building that is well ventilated. (1)

- (ii) L.P. gas storage facilities may have a fire resistant roof but it must be at least 2,5m above floor level. (1)
- (iii) The safety distance of the L.P. gas storage area from any buildings and hazardous areas is determined according to the volume of L.P. gas being stored. (1)
- (iv) Large L.P. gas storing facilities must be provided with an additional escape gate/s, fitted with a locking device that can be opened from the inside without the use of a key. (1)
- (v) The storage area must have a non-combustible floor with enough openings to allow for ventilation and drainage of any spillage. (1)
- (b) SANS 10087-7: 2013 indicate diagrams of L.P. gas filling areas. Sketch a diagram of a L.P. gas filling area against a boundary wall and indicate important safety distances. (15)
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62. (a) With reference to SANS 10087-7: 2013, regarding storage:
- (i) List the prescribed rules pertaining to the positioning of cylinders. (3)
- (ii) List the places to be avoided. (4)
- (iii) List the prescribed type of building with the corresponding limitation on the size of the permitted cylinder(s) (3)
- (b) With reference to SANS 10087-7: 2013, regarding filling:
- (i) Explain the process of filling by volume determination. (4)
- (ii) List the prescribed condition for storage of L.P. Gas containers. (6)
-
63. With reference to SANS 10087-7: 2013 regarding filling, list the inspection procedures regarding the following:
- (i) Damaged containers before filling. (10)
- (ii) Operation of container valves before filling. (6)
- (iii) Details to be put on a container after filling. (4)
-
64. (a) Prior to the filling of L.P. gas containers, the container must be visually inspected for damage. In terms of SANS 10087-7: 2013, list the defects that would cause cylinders to be regarded as damaged. (10)
- (b) Leaking L.P. gas cylinders pose a risk. List the actions to be taken in the event of LP gas cylinders that are leaking during filling. (4)
- (c) List the actions to be taken, in terms of SANS 10087-7: 2013 when dealing with leaking L.P. gas containers that are involved in a fire. (6)
-
65. With reference to SANS 10087-3: 2008, regarding vapourizers:
- (i) List the safety distances for direct-fired vaporizers. (10)
- (ii) What statutory information must be listed on the vapourizer itself? (10)
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66. With reference to SANS 10087-1: 2013, list the design and construction of LPG manifolds. (20)
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67. With reference to SANS 10089-1: 2008:
- (i) Explain explosion proof (3)
 - (ii) What is a gas free certificate? (2)
 - (iii) Describe an interceptor (3)
 - (iv) What is meant by the term “inerting”? (2)
 - (v) What is meant by “impounding around tanks by bunding”? (10)
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68. With reference to SANS 10089 –1: 2008:
- (a) Explain what must be taken into account when calculating the water requirements for foam application to a tank. (5)
 - (b) Discuss the safety requirements for traffic arrangements. (5)
 - (c) List the safety planning for roadways. (10)
-
69. With reference to SANS 10089-1:2008, explain the following.
- (i) General or cold work permit (2)
 - (ii) A confined space entry permit (5)
 - (iii) A hot-work permit (5)
 - (iv) An accident (2)
 - (v) A credible event. (1)
 - (vi) Vapour travel (5)
-
70. (a) With reference to SANS 10089-3:2010, what are the requirements for the transportation and off loading of coated and jacketed steel tanks? (10)
- (b) With reference to SANS 10089-3:2010, explain how “control of ignition” is maintained at a filling station fore-court. (5)
- (c) With reference to SANS 10089-3:2010 explain the “frequency of integrity testing” for underground tanks and pipe work. (5)
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71. List the standards in terms of SANS 10089–1: 2008 for the scope and scale of fire fighting equipment in terms of the following:
- (i) Water reticulation. (12)
 - (ii) Equipment needed for foam. (8)
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72. Define the following in terms of SANS 10089-3:2010:
- (i) Acceptable (2)
 - (ii) Approved (1)
 - (iii) Backfill material (2)
 - (iv) Competent person (3)
 - (v) Filler (1)
 - (vi) Flashpoint (3)

- (vii) Oxygenates (2)
 - (viii) Rapid drainage system (2)
 - (ix) Submersible pump (2)
 - (x) Dispenser. (2)
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73. (a) In terms of SANS 10089-3:2010, define the following:

- (i) Backfill material (2)
- (ii) Fibre-reinforced resin tank (2)
- (iii) Dispenser (2)
- (iv) Oxygenates (2)
- (v) Submersible pump (2)

(b) Give a brief explanation of the general purpose and procedure of backfilling for stability during tank installations. (5)

(c) With reference to electrical installation as per SANS 10089-3:2010, list the requirements for the provision and functions of the “emergency stop” at a filling station. (5)

74. With reference to SANS 10089–1: 2008 list the general safety guidelines for loading and unloading of road vehicles. (20)

75. (a) With reference to SANS 10089–2: 2007, list the recommendations for minimizing static electricity and hazardous practices associated with static electricity. (10)

(b) With reference to SANS 10131: 2004, list the requirements for the construction of bund walls. (10)

SOUTHERN AFRICAN EMERGENCY SERVICES INSTITUTE.

QUESTION BANK FOR: **DIPLOMA - FIRE SAFETY 400 (FST400)**

1. REQUIRED STUDY MATERIAL:

- Success Study Material – Book 1 of 1 - Fire Safety 4
- SANS 10400: Part A - 2010
- SANS 10400: Part T - 2011
- SANS 10400: Part W - 2011
- SANS 10087: Part 1 - 2013
- SANS 10087: Part 3 - 2008
- SANS 10087: Part 7 - 2013
- SANS 10087: Part 8 - 2010
- SANS 10089: Part 1 - 2008
- SANS 10089: Part 3 - 2010
- SANS 10131 - 2004
- SANS 10139 - 2012

2. ADDITIONAL STUDY MATERIAL

- Success Study Material – Book 1 of 1 - Fire Safety 3

3. QUESTIONS

- Questions **MUST** be read carefully to ensure clear understanding of the concept and/or content and apply them as such in your answers, for example:

◆	Describe:	Name the characteristics of something (a happening, object, method or subject).
◆	Define:	Give a concise description of the subject.
◆	Discuss:	Give a complete description of the subject.
◆	Give:	Write down names, facts, items, advantages and/or disadvantages. <u>Do not discuss.</u>
◆	List:	Write down names, facts, items, etc. In a specific order or according to specified categories.
◆	Name:	Write down names, characteristics, dates, items, components or facts.
◆	Draw:	Dot out, draw lines, sketch or formulate in graphic form (e.g. a drawing).
◆	Explain:	Make something more clearly for example by using illustrations, descriptions, examples and/or comparisons.

4. Study material and revision questions contained in the Success Manuals and SABS Codes of Practice (Relevant edition) is of vital importance, as it contributes to 100% of the questions.
5. Question paper is a three (3) hour paper and consisting of Six (6) and ALL of them must be answered.
6. All questions add to a total of twenty (20) marks per question with a total of hundred and twenty marks (120) marks for the whole paper.
7. Students are advised to attempt all assignments and questions in the study material to obtain more knowledge on the subject.
8. Please indicate on the front cover of your answer book the questions answered. Ensure that you have answered the correct number of questions. If there is questions that must not be marked, please put a line through such answer.
9. There is no required length or limit for your answers, unless it is stated so e.g. "an acceptable format". Questions can be sufficiently answered in less space, and it is okay to go over, if you think

it improves the response. Keep in mind, however, that a lengthier answer is not necessarily a better one.

10. You have an average of thirty (30) minutes for each question. Though grammar and style will not be a major factor in your grade, there should be a reasonable degree of organization and clarity. It is advisable to spend a few minutes planning your response, possibly even jotting down a very simple outline, rather than simply writing off the top of your head. (You may write notes on your answer book)

TAKE NOTE THAT THE "QUESTION GENERATOR" WILL RANDOMLY SELECT SIX (6) QUESTIONS OUT OF THIS SIXTY ONE (61) TO GENERATE THE RESPECTIVE QUESTION PAPER.

QUESTIONS

1. (a) List and discuss the fire tests for roof construction. (15)
(b) Explain the procedure for the fire resistant test for beams. (5)
-
2. (a) List the four (4) types of tests designed to evaluate building materials behaviour and influence when involved in fire. (4)
(b) Explain the fire test for walls. (10)
(c) Explain the fire test for floors. (6)
-
3. (a) Explain the procedure for the fire resistance test of beams (5)
(b) List and discuss the fire tests for roof construction. (15)
-
4. (a) Fire tests on materials are designed to evaluate specific properties or functions of the building materials.
(i) List the types of tests for building materials. (4)
(ii) Discuss the intention and procedure of the "large scale test". (6)
(b) Fire tests for "elements of structure" are done to determine fire resistance of complete elements. These elements must comply with certain criteria.
(i) List the different tests that could be done on structural elements. (3)
(ii) Discuss fire tests on floors. (7)
-
5. With reference to SANS 10400-T: 2011
(a) List the requirements for lighting of feeder and emergency routes. (10)
(b) List the requirements for fire detection and alarm systems. (10)
-

6. With reference to SANS 10400-A: 2010, define the A, B and C occupancy classifications of buildings as per A20. (20)
-
7. With reference to SANS 10400-T: 2011
- (a) List the requirements for smoke control. (10)
 - (b) List the requirements for floor finishes in emergency routes. (5)
 - (c) List the dimensions of components of escape routes. (5)
-
8. With reference to SANS 10400-W: 2011
- (a) List the requirements for fire pump connections. (10)
 - (b) Define the following:
 - (i) Communication pipe (2)
 - (ii) Fire installation (2)
 - (iii) Rational design (2)
 - (iv) Service pipe (2)
 - (v) Sprinkler system (2)
-
9. With reference to SANS 10400-T: 2011, list the requirements for lift shafts. (20)
-
10. With reference to SANS 10400-T: 2011,
- (a) list and discuss the requirements for the protection of roof space. (10)
 - (b) List the requirements for operating theatres and intensive care units. (10)
-
11. With reference to SANS 10400-T: 2011
- (a) List the requirements of safety distances for two or more buildings on the same premise. (10)
 - (b) Draw and label sketches to illustrate acceptable and unacceptable safety distances between buildings on the same premises. (10)
-
12. With reference to SANS 10400-A: 2010
- (a) Define the following occupancy classifications:
 - (i) B1 (2)
 - (ii) D2 (2)
 - (iii) E1 (2)
 - (iv) G1 (2)
 - (v) J1 (2)
 - (b) Define the following:
 - (i) Adequate (2)

- | | | |
|-------|--------------|-----|
| (ii) | Sewer | (2) |
| (iii) | Sewage | (2) |
| (iv) | Rodding eye | (2) |
| (v) | Storage tank | (2) |
-
13. With reference to SANS 10400-T: 2011, list the requirements pertaining to stairways and other changes of level along escape routes. (20)
-
14. With reference to SANS 10400-A: 2010, list the information needed on a site plan. (20)
-
15. With reference to SANS 10400-T: 2011
- | | | |
|-----|---|------|
| (a) | List and explain the general requirements as contemplated in Regulation T1. | (15) |
| (b) | List and explain the offenses as contemplated in Regulation T2. | (5) |
-
16. With reference to SANS 10400-T: 2011
- | | | |
|-----|---------------------------------------|------|
| (a) | List the requirements for hose reels. | (10) |
| (b) | List the requirements for hydrants. | (10) |
-
17. With reference to SANS 10400-W: 2011
- | | | |
|-----|--|-----|
| (a) | List and explain the requirements for fire installations as contemplated in Regulation W1. | (5) |
| (b) | List and explain the requirements for the water supply for the design of fire installations as contemplated in W2. | (5) |
| (c) | List and explain the requirements for the design of fire installations as contemplated in Regulation W3. | (5) |
| (d) | Explain the deemed-to-satisfy requirement as contemplated in Regulation W4. | (5) |
-
18. With reference to SANS 10400-T: 2011, define the following:
- | | | |
|-----|-------------------------------|-----|
| (a) | Air conditioning system | (2) |
| (b) | Artificial Ventilation System | (2) |
| (c) | Pressurization | (2) |
| (d) | Non Combustible | (2) |
| (e) | Fire shutter | (2) |
| (f) | Feeder route | (2) |
| (g) | Occupancy | (2) |
| (h) | Lapa | (2) |
| (i) | Emergency Route | (2) |
| (j) | Exit door | (2) |
-

19. With reference to the National Building Regulations and Building Standards Act, 1977, Act 103 of 1977 as amended.
- List and describe the powers of the Local Authority. (20)
-
20. With reference to SANS 10400-A: 2010
- (a) Name and explain the following occupancy classifications:
- (i) A5 (2)
 - (ii) D1 (2)
 - (iii) E2 (2)
 - (iv) H1 (2)
 - (v) J2 (2)
- (b) Define the following:
- (i) Deemed to satisfy requirement (2)
 - (ii) Functional regulation (2)
 - (iii) Prescriptive regulation (2)
 - (iv) Rational assessment (2)
 - (v) Rational design (2)
-
21. (a) List the principle controls of a wet pipe sprinkler system. (5)
- (b) List the gauges of a wet pipe sprinkler system. (3)
- (c) Explain the operation of a wet pipe sprinkler system. (7)
- (d) List the advantages of a fire hose reel in a fixed installation. (5)
-
22. A computer room is protected with a fixed gas system. List the fire prevention and protection requirements for such an installation. (20)
-
23. (a) List the six (6) types of standard sprinkler systems. (6)
- (b) Explain the reasons for installation and operating procedure for an alternate wet and dry system. (8)
- (c) Explain the operation of a pre-action system. (6)
-
24. Discuss foam systems under the following headings:
- (i) Fixed foam system. (4)
 - (ii) Foam monitor nozzles. (4)
 - (iii) Foam towers. (4)
 - (iv) Outdoor-tank fixed outlets. (6)
 - (v) Side dump outlet. (2)
-
25. With reference to sprinkler installations:
- (i) Name five (5) water supply systems. (5)

- (ii) Name five (5) types of sprinkler systems. (5)
 - (iii) Explain a tail end sprinkler system. (10)
-

26. With reference to sprinklers and bulk discharge systems:

- (a) State whether the following statements are TRUE or FALSE.
 - (i) A leaking sprinkler head will cause the alarm gong to actuate. (1)
 - (ii) Closing of the drain valve will cause the alarm gong to actuate. (1)
 - (iii) The opening of the test valve will cause the alarm gong to actuate. (1)
 - (iv) Damage on the side of the town mains will cause the alarm gong to actuate. (1)
 - (v) As a safety precaution, the freezing of a sprinkler installation will actuate the alarm gong. (1)
 - (vi) The stoppage of water to a sprinkler system will cause the alarm gong to actuate. (1)
 - (b) List the colour and temperature ratings of sprinkler quartzoid bulbs. (14)
-

27. (a) Discuss the different types and makes of sprinkler heads acceptable for general use under the following headings:

- (i) Conventional pattern (3)
 - (ii) Spray pattern (2)
 - (iii) Ceiling flush pattern (4)
 - (iv) Sidewall pattern (4)
 - (v) Dry pendant pattern (3)
- (b) With reference to sprinkler installations, list four (4) causes which may produce the ringing of the alarm gong. (4)
-

28. Fire screens are utilized in large buildings to subdivide roof space and assist with ventilation.

Explain the following:

- (i) The construction of these types of screens. (8)
 - (ii) The effect of screens during fire situations. (6)
 - (iii) The use of smoke- and fire-curtains. (6)
-

29. Discuss the requirements for pressurization system under the following headings:

- (i) Pressure required. (6)
 - (ii) Leakage path. (4)
 - (iii) Initial leakage path. (5)
 - (iv) Final leakage path. (5)
-

30. Discuss pressurization under the following headings:

- (i) What is pressurisation? (5)
 - (ii) Smoke movement. (4)
 - (iii) Air movement. (5)
 - (iv) Requirements of a pressurisation system. (6)
-

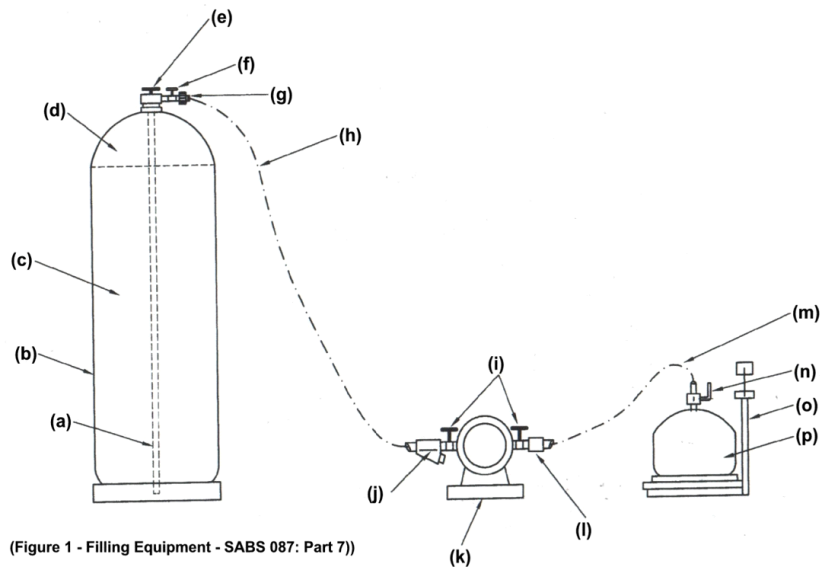
31. (a) List and explain the types of filters used in air-conditioning systems. (10)
- (b) List the requirements for insulating material used in ducting. (5)
- (c) Briefly explain the uses of flexible connections in ducting systems. (5)
-
32. With reference to ventilation in multi-storey buildings discuss the following:
- (a) Mechanical fire dampers. (10)
- (b) Intumescent coated honeycomb fire dampers. (10)
-
33. (a) List the effects of heat which provide the basic operation principles for heat detectors and give an example of each. (6)
- (b) Explain the “theory” of a bimetal strip. (4)
- (c) Briefly discuss the positioning of heat detectors with regard to:
- (i) Height. (6)
- (ii) Area. (4)
-
34. With reference to the control and Indicating equipment of fire detection systems:
- (a) Discuss the layout and considerations with regards to zones. (10)
- (b) List the considerations with regards to silencing and resetting the alarm. (10)
-
35. (a) Draw and label an ionisation detector during:
- (i) Normal or non-fire condition. (5)
- (ii) Fire condition. (5)
- (b) Discuss the operation of an ionisation detector during:
- (iii) Normal or non-fire condition. (5)
- (iv) Fire condition. (5)
-
36. With reference to SANS 10139: 2012
- List the considerations for the positioning of smoke sensitive or combustion gas detectors. (20)
-
37. With reference to Control and indicating equipment - Fire Detectors, discuss the following:
- (a) The Control Unit. (10)
- (b) Operation of silence alarms and reset. (6)
- (c) Monitoring of the system (4)
-

38. With reference to SABS 10087-7:2013

- (a) Sketch and label a LP Gas filling site against a boundary wall excluding a storage area. (10)
 - (b) List the requirements for a LP Gas cylinder storage area. (10)
-

39. With reference to SABS 10087-7:2013

- (a) Discuss the checking of L.P. gas cylinders after filling and the procedure for the handling of leaking cylinders during this process. (10)
- (b) Label the attached diagram "Filling Equipment". (10)



40. With reference to SABS 10087-8:2010

- (a) Briefly discuss the scope/purpose. (5)
 - (b) List the requirements for L.P. Gas filling sites for vehicles. (15)
-

41. With reference to SABS 10087-7:2013

Discuss the requirements for the location design and control of LPG filling sites. (20)

42. With reference to SABS 10087-7:2013

Discuss the storage of LPG containers under the following headings:

- (i) Storage areas. (5)
 - (ii) Conditions for storage. (7)
 - (iii) Safety requirements. (8)
-

43. With reference to SABS 10087-1:2013
- (a) List the prescribed rules for indoor location of LPG Containers. (10)
 - (b) List the prescribed rules for outdoor location of LPG containers. (10)
-
44. With reference to SABS 10087-7:2013
- (a) List the defects that would require LP gas cylinders to be regarded as damaged. (10)
 - (b) List the actions to be taken in the event of LP gas cylinders that are leaking during filling. (4)
 - (c) List the actions to be taken when dealing with leaking LP gas cylinders that are involved in a fire. (6)
-
45. With reference to SANS 10087-3:2008
- (a) What is the function of a vapourizer. (2)
 - (b) List eight (8) of the information markings you would find on a vapourizer. (8)
 - (c) List ten (10) safety precautions when working in sheds for filling of portable cylinders. (10)
-
46. With reference to SANS 10087-7: 2013:
- (a) Define filling area (4)
 - (b) Define liquefied petroleum gas (4)
 - (c) Discuss Properties of LPG and precautions to be observed. (12)
-
47. With reference to SANS 10089-1:2008 discuss the requirements for issuing of permits on the maintenance and extension of fuel depots with regard to:
- (a) Procedure before the issue of permit for any construction or repair work. (13)
 - (b) Details to be included in the permit. (7)
-
48. With reference to SANS 10089-1:2008
- (a) Define the following:
 - (i) Bulk depot. (2)
 - (ii) Effluent. (2)
 - (iii) Interceptor. (2)
 - (b) List the requirements for safety distances of bulk storage tanks. (3)
 - (c) List the requirements for the siting of a bulk depot. (11)
-

49. With reference to SANS 10089-1:2008
- Discuss the specifications for firefighting equipment at a bulk depot. (20)
-
50. With reference to SANS 10089-3: 2010
- Discuss the installation of underground storage tanks, pumps/dispensers and pipe work at service stations and consumer installations. (20)
-
51. With reference to SANS 10089-3: 2010
- (a) Give a brief summary on the scope. (5)
- (b) Give a brief explanation of the general purpose and procedure of backfilling for stability during tank installations. (5)
- (c) With reference to the electrical installation, list the requirements for the provision and functions of the “emergency stop” at a filling station. (10)
-
52. List the items to be inspected prior to the issuing of a transport permit for road tankers and other vehicles transporting hazardous substances. (20)
-
53. With reference to SANS 10089-1:2008
- Discuss bulk road and rail vehicle loading equipment under the following headings:
- | | | |
|-------|----------------------------|-----|
| (i) | Loading arrangements | (3) |
| (ii) | Layout | (5) |
| (iii) | Road vehicle loading areas | (3) |
| (iv) | Loading equipment | (3) |
| (v) | Platforms | (3) |
| (vi) | Earthing | (3) |
-
54. With reference to SANS 10131:2004
- (a) Explain bund walls. (10)
- (b) Explain fire walls. (5)
- (c) Explain fire test (2)
- (d) Explain water test (3)
-
55. With reference to SANS 10131:2004
- (a) Explain water supply & portable fire equipment under fire protection. (10)
- (b) Explain underground tanks in chambers. (10)
-

56. With reference to SANS 10089-1: 2008 bulk depot siting.
List and discuss the paramount importance of the siting of bulk depots from a fire and security point of view. (20)
-
57. Describe the fire safety requirements applicable to a coal preparation installation under the following headings:
- (i) Conveyers (5)
 - (ii) Driers (8)
 - (iii) Dust collectors and dust removal equipment (7)
-
58. List the fire safety requirements for the following:
- (i) High bay warehouses (10)
 - (ii) Pressurized stairways in an emergency route (10)
-
59. A major retail outlet approaches you for your advice, in which he wants to sell turpentine and at any one time he has about 3500 litres in his yard. List the requirements for the legal storage of this product. (20)
-
60. (a) List the fire safety requirements for aircraft hangars. (10)
- (b) List the rate of application for extinguishing media for aircraft hangars. (10)
-
61. Grain mills present certain risks. Describe the following:
- (i) Dust control (7)
 - (ii) Fire safety and prevention measures. (7)
 - (iii) Maintenance of fire protection installations. (6)
-

SOUTHERN AFRICAN EMERGENCY SERVICES INSTITUTE.

QUESTION BANK FOR: HIGHER DIPLOMA - FIRE SAFETY 500 (FST 500)

1. REQUIRED STUDY MATERIAL:

- Success Study Material – Book 1 of 2 - Fire Safety 5
- Success Study Material – Book 2 of 2 - Fire Safety 5
- SANS 10400: Part A - 2010
- SANS 10400: Part T - 2011
- SANS 10400: Part W - 2011
- SANS 10087: Part 1 - 2013
- SANS 10087: Part 4 - 2011
- SANS 10087: Part 7 - 2013
- SANS 10089: Part 1 - 2008
- SANS 10089: Part 3 - 2010
- SANS 10139 - 2012

2. ADDITIONAL STUDY MATERIAL

- Success Study Material – Book 1 of 1 - Fire Safety 3
- Success Study Material – Book 1 of 1 - Fire Safety 4

3. QUESTIONS

- Questions **MUST** be read carefully to ensure clear understanding of the concept and/or content and apply them as such in your answers, for example:

◆	Describe:	Name the characteristics of something (a happening, object, method or subject).
◆	Define:	Give a concise description of the subject.
◆	Discuss:	Give a complete description of the subject.
◆	Give:	Write down names, facts, items, advantages and/or disadvantages. <u>Do not discuss.</u>
◆	List:	Write down names, facts, items, etc. In a specific order or according to specified categories.
◆	Name:	Write down names, characteristics, dates, items, components or facts.
◆	Draw:	Dot out, draw lines, sketch or formulate in graphic form (e.g. a drawing).
◆	Explain:	Make something more clearly for example by using illustrations, descriptions, examples and/or comparisons.

4. Study material and revision questions contained in the Success Manuals and SABS Codes of Practice (Relevant edition) is of vital importance, as it contributes to 100% of the questions.
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7. Students are advised to attempt all assignments and questions in the study material to obtain more knowledge on the subject.
8. Please indicate on the front cover of your answer book the questions answered. Ensure that you have answered the correct number of questions. If there is questions that must not be marked, please put a line through such answer.

9. There is no required length or limit for your answers, unless it is stated so e.g. "an acceptable format". Questions can be sufficiently answered in less space, and it is okay to go over, if you think it improves the response. Keep in mind, however, that a lengthier answer is not necessarily a better one.
10. You have an average of thirty (30) minutes for each question. Though grammar and style will not be a major factor in your grade, there should be a reasonable degree of organization and clarity. It is advisable to spend a few minutes planning your response, possibly even jotting down a very simple outline, rather than simply writing off the top of your head. (You may write notes on your answer book)

TAKE NOTE THAT THE "QUESTION GENERATOR" WILL RANDOMLY SELECT SIX (6) QUESTIONS OUT OF THIS SIXTY SIX (66) TO GENERATE THE RESPECTIVE QUESTION PAPER.

QUESTIONS

- | | | | |
|-------|--------------------------------------|--|------|
| 1. | (a) | List the four (4) types of tests designed to evaluate building materials behaviour and influence when involved in fire. | (4) |
| | (b) | Explain the fire test for walls. | (10) |
| | (c) | Explain the fire test for floors. | (6) |
| <hr/> | | | |
| 2. | (a) | List and describe the three (3) possible criteria that are measured during fire tests on elements of construction. | (9) |
| | (b) | List and discuss the fire tests for roof construction. | (11) |
| <hr/> | | | |
| 3. | (a) | Fire tests on materials are designed to evaluate specific properties or functions of the building materials. | |
| | (i) | List the types of tests for building materials. | (4) |
| | (ii) | Discuss the intention and procedure of the "large scale test". | (6) |
| | (b) | Fire tests for "elements of structure" are done to determine fire resistance of complete elements. These elements must comply with certain criteria. | |
| | (i) | List the different tests that could be done on structural elements. | (3) |
| | (ii) | Discuss fire tests on floors. | (7) |
| <hr/> | | | |
| 4. | With reference to SANS 10400-T: 2011 | | |
| | (i) | List and explain the smoke control. | (10) |
| | (ii) | List and explain the air-conditioning and ventilation systems. | (10) |

5. (a) An architect approaches you for the requirements of a thatched roof structure on a residential stand. List the requirements in terms of SANS 10400-T: 2011. (3)
- (b) The architect informs you that the thatched roof structure is existing and is next to the neighbour's boundary wall. The edge of the thatch roof extends 200mm beyond the boundary wall. Discuss at least three (3) realistic options that could be considered. (9)
- (c) Discuss the advantages and disadvantages of the application of a fire retardant. (8)
-
6. With reference to the SANS 10400-T: 2011
- (a) List and explain fireman's lift. (10)
- (b) List and explain lift. (4)
- (c) List and explain lift shaft. (6)
-
7. With reference to SANS 10400-T: 2011
- (a) List the requirements of safety distances for two or more buildings on the same premise. (10)
- (b) Draw and label sketches to illustrate acceptable and unacceptable safety distances between buildings on the same premises. (10)
-
8. With reference to SANS 10400-T: 2011
- (a) List and explain the general requirements as contemplated in Regulation T1. (15)
- (b) List and explain the offenses as contemplated in Regulation T2. (5)
-
9. With reference to SANS 10400-T: 2011
- List and explain the fire safety requirements for stage and backstage areas. (20)
-
10. With reference to SANS 10400-T: 2011, define the following:
- (a) Unit fire load. (4)
- (b) Structural system. (4)
- (c) Surface fire index. (3)
- (d) Rational design. (3)

- (e) Mezzanine. (3)
- (f) Functional regulation. (3)
-
11. With reference to SANS 10400-T: 2011
- List and explain the fire safety requirements for seating arrangements in auditoria or halls and grandstands. (20)
-
12. With reference to SANS 10400-T: 2011
- Discuss the fire safety requirements for installation of liquid fuel dispensing pumps and tanks. (20)
-
13. With reference to SANS 10400-T: 2011
- (a) List the requirements for fire performance: General. (10)
- (b) List the requirements for protection of openings. (10)
-
14. With reference to SANS 10400-A: 2010, list the documentation and supporting information that must be submitted to the Local Authority by any person intending to erect a building. (20)
-
15. With reference to SANS 10400-T: 2011
- (a) State the requirements for access to buildings for fire fighting and rescue purposes. (10)
- (b) State the requirements for operating theatres and intensive care units. (10)
-
16. With reference to SANS 10400-T: 2011
- (a) List the requirements for lighting of feeder and emergency routes. (10)
- (b) List the requirements for fire detection and alarm systems. (10)
-
17. With reference to SANS 10400-A: 2010, list the information needed on a site plan. (20)
-
18. With reference to SANS 10400-W: 2011
- (a) List and explain the requirements for fire installations as contemplated in Regulation W1. (5)

- (b) List and explain the requirements for the water supply for the design of fire installations as contemplated in W2. (5)
- (c) List and explain the requirements for the design of fire installations as contemplated in Regulation W3. (5)
- (d) Explain the deemed-to-satisfy requirement as contemplated in Regulation W4. (5)
-
19. With reference to the National Building Regulations and Building Standards Act, 1977, Act 103 of 1977 as amended.
- List and describe the powers of the Local Authority. (20)
-
20. Sprinkler systems are designed for specific risk categories. List the categories and explain the design criteria of each type of system in relation to the risk. (20)
-
21. (a) List the methods of Carbon Dioxide (CO₂) application with a brief explanation of each. (10)
- (b) List the limitation of dry-chemical extinguishing agents. (10)
-
22. Sketch and describe a fixed foam installation to protect a flammable liquid store. (20)
-
23. With reference to fixed fire extinguishing installations, discuss the following:
- (i) Dry chemical systems. (12)
- (ii) Wet chemical systems. (8)
-
24. Discuss CO₂ installations under the following headings:
- i) Application and limitations of Carbon Dioxide (8)
- ii) Properties of Carbon Dioxide (8)
- iii) Methods of application (4)
-
25. Discuss Dry Chemical Powder fixed installations under the following headings:
- (i) System description (8)
- (ii) Flow Characteristics (3)
- (iii) System design (5)
- (iv) System Application (4)
-
26. Ventilation plays an important role in the fire safety of a building. Discuss the following components of ventilation from a “fire safety” viewpoint.
- (a) Vent position. (6)

- (b) Air inlets. (6)
- (c) List four (4) important factors that determine requirements for a ventilation system. (4)
- (d) Other factors that may influence the effectiveness of a ventilation system. (4)
-
27. A developer queries your recommendation that automatic fire venting be installed in his warehouse. In response, outline:
- (i) The merits of such a system, and (10)
- (ii) the principals he should consider when designing the system. (10)
-
28. Mechanical ventilation in buildings can be divided into three (3) groups:
- (i) List and describe these groups. (6)
- (ii) Discuss how smoke and heat are influenced by mechanical ventilation in the three (3) groups. (8)
- (iii) Discuss the effectiveness of fire dampers operated by individual heat sensitive detectors in preventing the spread of smoke in each group. (6)
-
29. With reference to Shopping Malls, discuss:
- (i) The effects of smoke movement within shopping malls. (10)
- (ii) Fire protection considerations in shopping malls. (10)
-
30. (a) An architect is considering the installation of fire vents in a single-storey building which is unprotected by sprinklers. He seeks your advice with regards to the following:
- i) Purpose of the vents. (5)
- ii) Method of operation. (3)
- iii) Siting. (2)
- (b) List the features that would significantly increase the efficiency of the vents. (10)
-
31. Discuss the rules for successful smoke ejection by means of mechanical horizontal ventilation. (20)
-
32. Ventilation plays an important role in the fire safety of a building. Discuss the following components of a ventilation system from a "Fire Safety" view point.
- (i) Ducting (4)
- (ii) Insulating Material (3)
- (iii) Purpose and risk of flexible joints (6)
- (iv) Purpose of flexible connection (3)

- (v) List three (3) types of dampers and explain the purpose of a fire damper (4)
-
33. (a) Describe the operation principle of radiation detectors. (4)
(b) Draw the schematic diagram of components of a "infra-red" detector. (6)
(c) Describe the operation and purpose of "Alarm line" detector cables. (5)
(d) Describe the operation of a "rate of rise" detector. (5)
-
34. Sketch and describe the two (2) general types of optical smoke detectors so that the difference of the two (2) types are shown clearly under normal and fire conditions. (20)
-
35. (a) List the basic components of an infra-red detector. (7)
(b) Explain how an infra-red detector works. (13)
-
36. (a) Draw and label an Ionization detector under non fire and fire conditions. (10)
(b) Describe the theory and practice for this type of detector. (5)
(c) Explain control areas or zones. (5)
-
37. With reference to SANS 10139: 2012
List the considerations for the positioning of smoke sensitive or combustion gas detectors. (20)
-
38. With reference to Control and indicating equipment - Fire Detectors, discuss the following:
(a) The Control Unit. (10)
(b) Operation of silence alarms and reset. (6)
(c) Monitoring of the system (4)
-
39. With reference to SABS 10087-1:2013 list the requirements for the location of LPG containers under the following headings:
(i) General. (6)
(ii) Indoor location. (6)
(iii) Outdoor location. (8)
-

40. With reference to SABS 10087-7:2013 discuss the prevention and control of fires involving LPG under the following headings:
- (i) General information. (5)
 - (ii) Leakage of gas. (3)
 - (iii) Action in emergency. (12)
-
41. With reference to SABS 10087-4:2011 discuss the requirements for the protection against fire and electrical hazards of vehicles transporting LPG under the following headings:
- (i) Fire precautions. (8)
 - (ii) Electrical precautions. (8)
 - (iii) Inspections. (4)
-
42. With reference to SABS 10087-7:2013:
- (i) List the requirements for the employee/operator carrying out the inspection for the filling and handling of LPG containers. (13)
 - (ii) List the properties of LPG and precautions to be observed. (7)
-
43. With reference to SABS 10087-1:2013:
- (i) Describe the recommendations to be considered when laying out and installing pipe work. (10)
 - (ii) What are the in-situ filling requirements for containers (dumpsies). (10)
-
44. With reference to SABS 10087-7:2013 what are the inspection procedures for the following:
- (i) Containers being damaged before filling. (10)
 - (ii) Working order of container valves before filling. (5)
 - (iii) Information and markings that should be clearly displayed on the container before filling. (5)
-
45. With reference to SANS 10089-1:2008:
- (i) Indicate your considerations for the determination of siting for a bulk fuel depot during the planning phase. (10)
 - (ii) List the main considerations that should be covered under "Scale of fire fighting equipment". (10)
-
46. With reference to SANS 10089-3:2010 discuss the requirements for the installation of underground tanks for flammable liquids under the following headings:
- (i) Excavations. (6)

- | | | |
|-------|---------------------|-----|
| (ii) | Backfill material. | (6) |
| (iii) | Backfill procedure. | (8) |
-
47. With reference to SANS 10089-3:2010:
- | | | |
|-----|--|-----|
| (a) | Give a brief summary on the scope. | (5) |
| (b) | Explain the general purpose and procedure of backfilling for stability during tank installations. | (5) |
| (c) | List the requirements of the electrical installation for the provision and functions of the “emergency stop” at a filling station. | (5) |
| (d) | List the requirements for the transportation and off loading of steel tanks. | (5) |
-
48. With reference to SANS 10089-1:2008
- | | | |
|-------|---|------|
| (a) | Define the following: | |
| (i) | Bulk depot. | (2) |
| (ii) | Effluent. | (2) |
| (iii) | Interceptor. | (2) |
| (b) | List the requirements for safety distances of bulk storage tanks. | (3) |
| (c) | List the requirements for the siting of a bulk depot. | (11) |
-
49. With reference to SANS 10089-1:2008
- | | | |
|--|--|------|
| | Discuss the specifications for firefighting equipment at a bulk depot. | (20) |
|--|--|------|
-
50. With reference to SANS 10089-1:2008 discuss the requirements for issuing of permits on the maintenance and extension of fuel depots with regard to:
- | | | |
|-----|---|------|
| (a) | Procedure before the issue of permit for any construction or repair work. | (13) |
| (b) | Details to be included in the permit. | (7) |
-
51. The Town Planners notify you of the intent to develop a new residential area in close proximity to a major hazard installation. Discuss your responsibility as person in charge of fire safety as well as possible participation of your inspectors in this project.
- | | | |
|--|--|------|
| | | (20) |
|--|--|------|
-
52. Legislation is used to enforce fire safety. List and motivate the possible legislation that could be utilized for this purpose.
- | | | |
|--|--|------|
| | | (20) |
|--|--|------|
-

53. (a) Describe the actions, procedures and requirements for the taking of samples and the safekeeping of evidence during fire investigations. (10)
- (b) Discuss the taking of photographs during fire investigations. (10)
-
54. A retail outlet in your area proposes to store 4 m³ of methylated spirits (in liter bottles and 25 liter drums) inside the premises.
- (a) List the fire safety requirements to store this commodity. (10)
- (b) Advise the retailer as to how, where and the quantity of methylated spirits he may display for selling purposes. (10)
-
55. (a) List the fire safety requirements for aircraft hangars. (10)
- (b) List the rate of application for extinguishing media for aircraft hangars. (10)
-
56. (a) Upon arrival for a routine inspection, the owner refuses you access to his premises. List your actions under the following headings:
- (i) Initial approach. (5)
- (ii) Important information. (3)
- (iii) Access procedures. (5)
- (b) During the inspection it become obvious that the premises does not comply and the owner indicates that he is willing to comply but has major financial constraints. Give guidelines on possible assistance to accommodate this situation without compromising life safety. (7)
-
57. With reference to Shopping Malls, discuss:
- (i) The effects of smoke movement within shopping malls. (10)
- (ii) Fire protection considerations in shopping malls. (10)
-
58. Discuss emergency planning for Health Care Facilities. (20)
-
59. With regard to electronic data processing rooms, discuss:
- (i) The fire prevention requirements for this type of facility. (10)
- (ii) The fire protection requirements for this type of facility. (10)
-
60. (a) Name two methods of applying an inert gas. (2)
- (b) Describe each under its own heading. (8)

- (c) Why do fires in underground and un-fenestrated buildings pose special hazards? (10)
-
61. List the fire safety requirements for the following:
- (i) High bay warehouses (10)
 - (ii) Transformer rooms. (10)
-
62. Grain mills present certain risks. Describe the following:
- (i) Dust control (7)
 - (ii) Fire safety and prevention measures. (7)
 - (iii) Maintenance of fire protection installations. (6)
-
63. Discuss safety protection in laboratories that pose a radiation hazard. (20)
-
64. Prior to the issue of a transport permit, tankers and other vehicles transporting hazardous substances must be inspected by the fire services.
- List the items on the checklist to be inspected. (20)
-
65. (a) Explain refuse chute. (2)
- (b) Discuss the safety problems they present in a building. (8)
- (c) Explain the term windowless. (10)
-
66. Describe the fire safety requirements applicable to a coal preparation installation under the following headings:
- (i) Conveyers. (5)
 - (ii) Driers. (8)
 - (iii) Dust collectors and dust removal equipment. (7)
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