

Module 5 Decontamination Natural & Terrorists CBR agent

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Focus: Contractors Management

Forward

This module is paired with other sections to provide uniform expectations and expected results from all parties. The module identifies the special working parameters of decontamination, quality control clearance and describes procedures from inception to completion. This module compliments the technician module 6 which details the decontamination procedure.

1) Health & safety Legislation

- a) Overview
- b) Specific responsibilities
- c) Necessity

2) Overview of CBR agents and effects

- a) Overview of Risk & Hazard associated with CBR agents
 - i) Acute effects
 - ii) Chronic
 - iii) Routes of ingress
- b) Prophylactic care
- c) PPE Personal Protection Equipment. (Limitations & Use)
- d) Site and Environmental problems/solutions
- e) Working conditions and specific associated cost & safety elements
- f) Site & personal decontamination procedures,
- g) Accidental Exposure (outline only)
- h) Emergency procedures (generic)

3) Incident & Command

- i) Management tree
- ii) Location
 - (i) Site office
 - (ii) Records
 - (iii) Security
 - (iv) Site information
- iii) Emergency Procedures
 - a. Site-Area Closure
 - b. Re-location
- (ii) On Call events
- (iii) On Site Accidents
- (iv) Pear Shape Planning
- iv) Telephone contacts
- v) Names & Addresses
- vi) Written procedures
- vii) Audit

b) Out of hours plan

- i) Cascade notification
- ii) Emergency action team
- (i) Higher levels of protection

Module 5 Decontamination Natural & Terrorists CBR agent

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- iii) Networking
- iv) Suppliers
- (i) Contact information (24 hour)
- (ii) Audit

c) Secondary Events

- i) Off site records
- ii) Plans
- iii) Networking potential
- iv) Organised withdrawal
- v) Secondary decontamination facility. (networking)
- vi) Site Evacuation Notification method
- vii) Muster Point

d) Audit

e) Logistics

- i) Supply & delivery of materials
- ii) Storage of materials
- iii) Waste management
- iv) Transport control & Safety
- v) Waste disposal certification
- vi) Routes to Disposal
- vii) Storage facilities

f) Liaison

- i) Blue light
- ii) LA
- iii) HSE
- iv) GDS
- v) Client

g) Welfare

- i) Legal obligations
- ii) Types of welfare
- iii) Economies
- iv) Necessity
- v) Procedures
- (i) Transit routes
- (ii) Transit procedures
 - a. Protection
 - b. Controls
- (iii) Decontamination
- (iv) Short break procedure

4) Site Documentation

a) CDM

- i) Designer
- ii) Planning Supervisor
- iii) Principle Contractor

b) Central location display (Availability)

c) Contractor details

d) Client details

e) Health & Safety Policy

f) COSHH Data

g) Risk & Hazard Assessments

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- h) Method statement
- i) Equipment documentation
- j) Personnel Records
- k) Site attendance log (Personnel)
- l) Emergency procedures
- m) Emergency contact details
- n) CDM documentation where applicable
- o) Government or HSE special instructions/Notification
- p) Details of nearest Medical assistance
- q) Site safety officer & route to contact
- r) Name & contact details of site first aid
- s) Site medical cabinet (location) keys

5) Site Visitors

- a) Appointment Requirements
- b) Authorising authorities
- c) Competence & Certification
- d) PPE & Suitability
- e) Insurance & liability issues
- f) Tool box talk
- g) Escort rules
- h) Waiver (legal)

6) Client Responsibilities

- a) Clear objectives and contract terms
- b) Provide all known hazard or risk information
- c) Dispute resolution procedures

7) Response parameters

- a) Emergency response
- b) 24 seven
- c) 7 day warning
- d) Retainer
- e) Support only

8) Day rate or Quotation

- a) Pricing Schedules & variation orders
- b) Shortfalls and benefits
- c) Monitoring
- d) Value for money
- e) Contractor penalty and reward issues
- f) Stage payment provision
- g) Provision to authorise and signatory

9) Contracts & Specification

- a) **Type of contract**
 - i) Isolated small incident
 - ii) Single building
 - iii) Complex
 - iv) Wide area (plume or swirl contamination)

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b) Expectations

- i)** Client
- ii)** Insurer
- iii)** Local Authority (managing agent)
- iv)** HSE (GDS)
- v)** Contractor
- vi)** Building Occupants (employees)
- vii)** Freeholder (property owner)
- viii)** Third party interest
- ix)** Press & public

c) Clearance issues

- i)** Specific areas
- ii)** Whole site
- iii)** External problems

10) Recontamination problems

- a)** Primary aerosols
- b)** Secondary aerosols
- c)** Secondary events
- d)** Traffic & visitors
- e)** Malicious act
- f)** Resolution

11) Scientific assessment and clearance limitations

- a)** Guarantees & limitation acceptance
- b)** Extras & unexpected costs
- c)** Scope drift
- d)** Stage Payments & responsibilities
- e)** Authorisation & Responsibility issues
- f)** Failure and abort contingency
- g)** Non Compliance Dismissal procedure
- h)** Fast Track Resolution terms

12) Contractor responsibilities

- a)** Compliance with all legislative requirements
- b)** Site Safety & induction
- c)** Dynamic-Rolling Risk & Hazard Assessments
- d)** Site Control Procedures
- e)** Triage assessments
- f)** Salvage - Disposal assessments
- g)** Project viability and contingency plans
- h)** Mitigation Techniques
- i)** Competent approach
- j)** Efficiency & Economy of work
- k)** Effective documented and provable decontamination
- l)** Cooperation and assistance to third parties
- m)** Long Tail Claim liability issues
- n)** Prevention of unauthorised entry to site (security)
- o)** Control access and ensure safety of authorised visitors
- p)** Tool Box Talks (Tailgate Talks)

Module 5 Decontamination Natural & Terrorists CBR agent

Written by Jeff Charlton 08700 789 999

13) Health & Safety

- a) Civil & Criminal Liability issues
- b) CDM compliance
- c) Legal Requirements H&SW MHSW Acts COSHH
- d) Duty of Care
- e) Employee safety
- f) Visitor safety
- g) Public safety
- h) Records & Documentation

14) PPE

a) Types of PPE explained

- i) Level A GTCPS (*gas tight chemical protection suite*)
- (i) SCBA types safety, working limitations
- (ii) Heat stress
- (iii) Re-Breathers
- (iv) Cooling procedures and equipment
- (v) Supply air and filtration
- ii) Level B
- iii) Level C
- iv) Level D

b) Respirators Types

- i) Full face
- ii) Powered (PAPR)
- iii) Piggy
- iv) Disposable
- v) Filter types
- vi) Protection factors

c) Maintenance

- i) Fit Testing
- ii) Inspection procedures
- iii) Maintenance
- iv) Records

d) Don & Doffing equipment

- i) Use of tape or sealing aids
 - a. Usefulness
 - b. Dangers
- ii) Working limitations of equipment
- iii) Working limitations of operator
- (i) Desk top exercise
- (ii) Live roll play (subject to course type)

15) Employee Safety

- a) Selection of employees
 - i) Physical fitness and suitability
 - ii) Medicals
 - iii) Psychological testing
- b) Team selection & leadership skills
- c) Heat stress
- d) Dehydration

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- e) Working parameters
 - i) Live stress testing in PPE
 - ii) Production rate in and out of PPE
 - iii) Breaks and procedures

16) Confined Space & Isolated work

- a) Legal obligations
- b) Safety & common sense
- c) Accident or Emergency
- d) Notification
- e) Confined space working procedures
- f) Buddy Buddy systems
 - i) 123 Rule
 - ii) Extraction procedures

17) Daily employee Inspection/medical

- a) Procedure
- b) Notification

18) Incident Emergency Call out Protocol

- a) Gathering information by (senior permanent competent employees)
 - i) Police
 - ii) Fire Service
 - iii) GDS
 - iv) Client
 - v) Obtaining Passes/Entry Permits
- b) Nominated Advice sources
- c) Risk & Hazard assessments
- d) Choice of PPE
- e) Establishing Decontamination procedure
- f) Medical support issues
- g) Buddy Buddy procedures
- h) Communication procedures
- i) Inspection
- j) Mitigating controls assessments
- k) Triage assessments Pre Inspection details
- l) Report to client & develop plan

19) Initial Works protocol

- a) Install decontamination procedures
- b) Make safe
- c) Establish emergency controls
- d) Undertake Triage procedures

20) Evaluate & report

21) Viability & Risk

- a) Time line & Cost estimation
- b) Balance decontamination cost against property value
- c) Assess criticality of installation
- d) Recommend alternative economic solutions where uneconomic
- e) Recommend control and containment factors where necessary
- f) Assess the potential need for competent assistance.
- g) Cross contamination issues
- h) Re contamination issues

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- i) Payment and accountability

22) Quality Control Protocols

- a) Typical applications and necessity
 - i) Examples of failure
 - ii) List benefits
 - iii) Domino effect (explanation)
- b) Identification of Q/C parameters
 - i) Importance
 - ii) Significance
- c) Measurement techniques
- d) Accountability
- e) Monitoring and compilation
- f) Record keeping
- g) Audit records
- h) Proof

23) Quality control Accountability

- a) Duty Holder
- b) Frequency Issues
- c) Check list parameters
- d) Non Compliance
 - i) Procedures
 - ii) Rectification
- e) Documentation and Notification
 - i) Client reports (frequency)
 - ii) RIDDOR
 - iii) Procedures for major failures
 - (i) Identification of parameters
- f) Record Holding
- g) Requirement to store records safely (period)

24) Site Control & Mitigation techniques

- a) Perimeter controls
- b) Building encapsulation principles
- c) Location of security access and egress points to Hot Zone
- d) Location of waste storage and equipment, parking etc
- e) Marking out visitor routes
 - i) Authority to enter
 - ii) Tool box talk
- f) Location of Decontamination Units
- g) Identification of contaminate transit routes and contractor controls
- h) Emergency Management systems First Aid –Uncontrolled exposure leaks etc
 - i) Man down procedures
 - ii) Medical assistance procedures
 - iii) Breach in security
 - iv) Breach in enclosure or failure of controls
 - (i) Desk top Exercise
 - (ii) Live Roll Play

25) Standard of works

- a) Clear objectives
- b) Written instructions

Module 5 Decontamination Natural & Terrorists CBR agent

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- c) Site induction
- d) Procedure training
- e) Monitoring
- f) Quality control Inspections

26) Improvements & Suggestions

- a) Procedures
- b) Joint Benefits
- c) Management route
- d) Acceptance notification

27) 24 Hour (Continuous Working)

- a) Quality control problems
 - i) Improving procedures
 - ii) Accountability failures
 - iii) Recommendations
- b) Shift change requirements
 - i) Transferring information
 - ii) Overlap requirement
 - iii) Managing information
 - iv) Accountability
- c) **Isolating or encapsulation of external envelope**
 - i) General mitigation techniques
 - (i) Boarding
 - (ii) Weathering
 - (iii) Trespassers
 - (iv) Sealing ingress & egress points
 - (v) Controlling run off
 - ii) Shrink wrapping
 - iii) Encapsulating sprays
 - iv) Sacrificial coatings
- d) **Zone isolation**
 - i) Physical barriers
 - ii) Pneumatic devices
 - iii) Security management
 - iv) Temperature use
 - v) Laminar Air Flow
 - vi) Air Locks
 - vii) Air curtains

28) Emergency Lock Down

- a) **Mitigation Techniques**
 - i) Absorption
 - ii) Adsorption
 - iii) Sealing
 - (i) Temporary
 - (ii) Semi Permanent
 - iv) Covering and encapsulation
 - v) Wide area solutions
 - vi) Localised events

Module 5 Decontamination Natural & Terrorists CBR agent

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b) Development of containment “Safety Air Locks”

- i) Theory of utilising positive and negative pressure**
- ii) Measurement of pressure “Pascal’s”**
- iii) Erecting enclosures**
- (i) Practical hands on sessions**
 - 1. Building enclosures
 - 2. 3 Stage Air Locks
 - 3. Measuring leakage
 - 4. Collapse issues

c) Air Filtration-Scrubbing

- i) Methods of filtration**
- ii) Types of filtration**
 - (i) Hepa**
 - (ii) UHepa**
 - (iii) Electrostatic**
 - (iv) Carbon**
 - (v) Normal installed**
- iii) Types of equipment and limitations**
- iv) Utilising existing engineering controls**

29) Contamination Behaviour

- a) Adsorption**
- b) Absorption**
- c) Entrapment (fibres)**
 - i) Demonstration**
- d) Cavities**
- e) Smooth surfaces**
- f) Rough surfaces**
- g) Aerosolisation**
 - i) Secondary aerosols**
 - ii) Brownian Motion**
 - iii) Neutralising Brownian**
- h) Electrostatic attraction**
 - i) Benefits & problems**
- i) Stack Effect**
- j) Laminar Air flow**
- k) Turbulent air flow**
- l) Temperature influences**
- m) Lift pressure differentials (control)**

30) Waste Water Filtration-Treatment

- a) Controlling run off**
- b) Containment techniques**
 - i) Bund walls**
 - ii) Solidification**
 - iii) Collection**
- c) Filtration methods**
- d) Neutralisation**
- e) Water Authorities**

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31) Waste Management

- a) Legal requirements**
- b) Site waste storage facility and clearance procedures**
 - i) Collection responsibility**
 - ii) Bagging**
 - iii) Signage**
 - iv) Record keeping**
- c) Waste carriers licence**
- d) Chain of Custody**
- e) Government Notification requirements**
- f) Identified waste disposal site**
- g) Route Planning**
- h) Transportation Criteria**
 - i) Type of vehicle**
 - ii) Training of driver for emergencies**
 - iii) On board response equipment**
 - iv) Vehicle Display boards**
- i) Certification**
- j) Records**

k) Interstitial leakage

- i) Visual inspection techniques**
- ii) Pressure differentials**
- iii) Measurement techniques**
- iv) Leak detection**

l) Ventilation systems

- i) Overview of HVAC systems**
- ii) Supply & return issues**
- iii) Plenums**
- iv) Inspection techniques**
- v) Triage assessments**
- vi) Viability alternatives**
- vii) Isolating controls**
- viii) Cleaning methods**
 - (i) Air & Skipper balls**
 - (ii) Rotary brushes**
 - (iii) Dry Ice**
 - (iv) Manual**

32) Envelope leakage

- a) Reverse flow toilets and kitchen extracts**
- b) Physical barriers**
- c) Air scrubbing techniques**
- d) Site ingress and egress routes**
- e) Placement of Decontamination units**
- f) Site perimeter controls**
- g) Visitor controls and**
- h) Internal Waste storage and control**

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33) Personal & Personnel Decontamination

- a) Emergency decontamination
- b) Water & Temperature
- c) Surfactants
- d) Collection techniques
- e) PPE decontamination & storage

34) Personnel Site Decontamination Procedure

- a) **Site of Decontamination Unit**
- b) **Travelling to decontamination unit**
- c) **Route In - Out**
- d) **Construction parameters**
 - i) Storage
 - ii) Charging facilities
 - iii) Pressure differentials
 - iv) Testing & certification
 - v) Heating & water temperature
 - vi) Self assessments (injury)
 - vii) Don & Doffing procedures
 - viii) Soap & towels
 - ix) Underwear
 - x) Cooling jackets
 - xi) Waste Collection

35) Site Decontamination Unit

- a) Description
 - i) 3 stage air lock
- b) Procedures

36) Storage & Use of PPE

- a) Face Fit Testing
- b) Filter type
 - i) Inspection
 - ii) Loading
 - iii) Change regime
- c) PAPR
 - i) Battery charging
 - ii) Flow rates
- d) Cleaning
 - i) Decontamination procedures
- e) Storage
- f) Daily Inspection
 - i) Training
- g) Weekly inspection
 - i) Training
- h) Monthly inspection
 - i) Training
- i) Records
- j) Accountability

37) Re Breathers Specific

- a) Decontaminating units end of shift
- b) Ice
- c) Cooling jackets

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38) Type of Suit

- a) Cleaning or disposal procedures
- b) Colours used and code
- c) Material specification
- d) Type protection factor(specification)

39) Types of Glove

- a) ID
- b) Gauntlet
- c) Glove
 - i) Type
- d) Material
- e) Sizes
- f) Safety procedures
 - i) Under gloves
 - ii) Latex issues

40) Boots

- a) ID
- b) Colour
- c) Type
- d) Material
- e) Overshoes
 - i) Transit procedures

41) Decontamination Procedures

Overview of benefits and limitations of systems:

- a) Source removal
 - i) Vacuum
 - ii) Collection
 - (i) Solidification
 - (ii) Isolation
 - iii) Washing
 - iv) Jetting
 - (i) Hot & Cold
 - (ii) Steam
 - (iii) Surfactant in stream
 - (iv) Application of Surfactant
 - 1. In Line
 - 2. Pre jetting
 - (v) Foaming agents & application
 - 1. Control & collection
 - (vi) Types of Surfactants
 - 1. Cationic
 - 2. Ionic
 - 3. Non Ionic
 - 4. Amphoteric
 - v) Heat & Evaporation (VOCs)
 - (i) Direct destruction
 - (ii) Gas & Oil
 - (iii) Air enhancement

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- b) Dilution
- c) Transformation
- d) Neutralisation
- e) Decay

42) Techniques for decontamination

a) Chemical

- i) Gas
- ii) Thermal fogging
 - (i) Specific safety & hazards
 - iii) Wet fogging
- iv) Micro fogging (Static Charge)
- v) Broadcast application
- vi) Direct application (swabbing-washing)
- vii) Reaction and neutralisation

b) Environmental controls

- i) Containment
- ii) Temperature & Humidity controls
- iii) Measurement

c) Mechanical

- i) Non abrasive blasting
- ii) Low and high pressure blasting
 - (i) Wet-dry and vacuum techniques
 - (ii) Recoverable media
 - (iii) Soluble media
 - (iv) Dust control techniques
- (v) Dry ice option

d) Vacuum

- i) Mass negative pressure installed as control
- ii) Agitation and collection
- iii) Containment and Isolar panels
- iv) **General Extraction techniques**
 - (i) Types of vacuum cleaner
 - (ii) Extraction techniques
 - (iii) Truck mounts
- v) **Types of pump**
 - (i) Puddle pumps
 - (ii) Float pumps

43) Sub Surface Contamination

- a) Prevention
- b) Mitigation
- c) Control
- d) Removal techniques

44) Electronic Decontamination

- a) Types of equipment
- b) Safety issues
- c) Removal issues

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- d) Ultrasonic
- e) Chlorides- corrosion
- f) Drying

45) Application systems

- a) UV Photo activated (strobe)
- b) Ozone Generators & Hydrogen peroxide
- c) Nebulae curtain
- d) Foams and foaming agents etc
- e) Air curtain & collection
- f) Gas generators (chlorine dioxide)
- g) Sprays and broadcast systems
- h) Electrostatics as a tool
 - i) Electrostatic precipitation
- i) Benefits & shortfalls of each system

46) Heat & Ventilation

- a) VOCs
- b) Stack effect
- c) Evaporation
- d) Movement generally

47) Protocol for decontamination

- a) Planning and start point
- b) Horizontal surfaces
- c) Vertical surfaces
- d) Soft furnishings
- e) Hard surfaces
- f) Electronic equipment
 - i) Internal contamination
 - ii) Decontamination Techniques
- g) Salvage or disposal
 - i) Viability
 - ii) Time
 - iii) Storage
- h) Floor covering assessments
- i) Return air plenums
- j) Raised deck flooring
- k) Cable trays
- l) Chased cavities

48) Secondary Aerosols

- a) Prevention
- b) Mitigation
- c) Control

49) Vehicle decontamination

- a) Urgency & Viability
- b) Strip outs
- c) Cavities
- d) Specific concerns
 - i) Ventilation systems
 - ii) Functionality
- e) Chemical compatibility

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- f) Corrosion & electric circuits
- g) Fast track approach & results

50) Transportation of contaminated materials

- a) Containment techniques
- b) Types of vehicle
- c) Receptacles
- d) Emergency procedures

51) Maximising Decontamination Performance

- a) Temperature and Humidity
- b) Dwell time & Production
- c) Pressure/Flow
- d) Air speed/volume
- e) Volume and compartmentalisation
- f) Concentration or strength
- g) Velocity
- h) Identification of combination problems and solutions
- i) Grid lines
- j) Post clean Protection
- k) Quality Control
 - i) Accountability
 - ii) Records

52) Controlling Environmental conditions

- a) **Introducing heat**
 - i) Direct
 - ii) Indirect
 - (i) Infrared
 - (ii) Convection
 - (iii) Conduction
 - (iv) External sources

53) Temperature Gradients

- a) **Use & Benefits**
- b) **Control issues**
- c) **Controlling humidity**
 - i) Specific humidity
 - ii) Relative humidity Measuring humidity
 - iii) Humidifiers
 - iv) De-humidifiers
 - v) Measuring humidity
 - (i) Psychometric charts
 - (ii) Dew Point
- d) Record keeping
- e) **Drying Parameters**
 - i) Bound & Free water
 - ii) Evaporation
 - iii) Collection
 - iv) Advection
 - v) Air movement

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f) Mould

- i) Health issues**
- ii) Prevention**
- iii) Control**
- iv) Remediation**
- v) Clearance & Measurement**

54) Inspection & monitoring techniques

- a) Final Clearance inspection parameters & Goal**
- b) Quality control techniques**
 - i) Dynamic assessments**
 - ii) Third party confirmation**
 - iii) Monitoring techniques**

55) Sampling as QC Requirement

- a) Sampling Frequency**
- b) Recording environmental conditions**
- c) Training for sampling role**
- d) Sample types**
 - i) Tape lifts**
 - ii) Culture plates**
 - iii) Aero –cassettes**
 - iv) Bulk**
 - v) Swab**
 - vi) Wipes**
 - vii) Zumo canisters**
- e) Enhanced sampling approach**
 - i) Acid, Base or solvent release**
 - ii) Surfactant**
 - iii) Extraction techniques**

56) Equipment Specification and Choice

- a) Breathing apparatus**
- b) PPE**
- c) Jetting equipment**
- d) Blasting equipment**
- e) Vacuum and Air pressure devices**
- f) Monitoring equipment**
- g) Training & maintenance requirements**

57) Work Completion

- a) Total or sectional**
- b) Independently and in Unison**
 - i) Benefits and Shortfalls**
- c) Third Party inspection**
- d) Review of documentation**
- e) Review of quality control procedures for compliance**
- f) Independent Clearance**
- g) Types of clearance criteria agreed prior to work commencement**
 - i) 1st Clearance *Working Site***
 - ii) 2nd Clearance *Removal of Negative pressure***
 - iii) 3rd clearance *Removal of barriers containment***
 - iv) 4th clearance *Equipment removal or disposal***

Module 5 Decontamination Natural & Terrorists CBR agent

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v) 5th Final Clearance *Third Party Certification*

58) Practical Section (hands on & roll play (course type permitting))

- a) Use of equipment
- b) PPE Don & Doffing
- c) Working in simulated decontamination scenario
- d) Decontamination units
- e) Temperature stress

59) Secondary sub sequential damage

- a) Types of expected damage
- b) Prevention
- c) Mitigating controls
- d) Acceptance or route to satisfaction

60) Pear shape Procedures

- a) What If?

61) Records & Audit

- a) Template forms
- b) Management systems
- c) Procedures
- d) Timelines and agreements

62) Your Day in Court

- a) Defending your actions
- b) Proving your defence

63) Written Examination (Closed Book if required)