

## CSS322 – Quiz 3

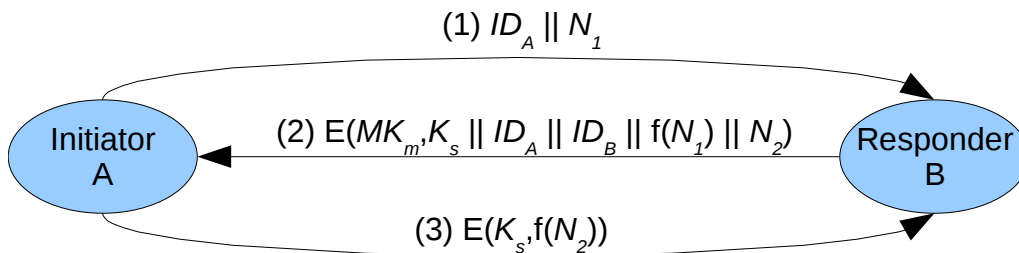
Name: \_\_\_\_\_

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Mark: \_\_\_\_\_ (out of 10)

### Question 1 [5 marks]

Below is an example de-centralised key distribution protocol that may be used.  $MK_m$  is the master key shared between two nodes A and B (this sharing must be done manually/physically), and  $K_s$  is the session key.



- How many master keys are needed in a network using this key distribution protocol if there are 11 nodes in the network? [2 marks]
- If a KDC (using the protocol covered in the lecture) was used instead of the above de-centralised protocol, how many master keys would be needed in the network? [1.5 marks]
- What is the benefit of using the de-centralised protocol compared to simply using the physically exchanged master keys for encrypting the session data? [1.5 marks]

### Question 2 [1.5 marks]

Consider the following algorithms/concepts: DES, AES, Eulers Totient. Which *cannot* be used to generate random numbers? If more than one cannot be used, you must write both; if all of them can be used, then write “all appropriate”.

**Question 3** [3.5 marks]

Calculate the following (write answer in space provided, show any calculations below, you cannot use a calculator):

a)  $\Phi(24)$

Answer: \_\_\_\_\_

b)  $\Phi(31)$

Answer: \_\_\_\_\_

c)  $3^{24} \bmod 25$

Answer: \_\_\_\_\_