

# Description of the MTech Entrance Test

## 1. Introduction

ISS has many applicants for the Master in Technology in Knowledge Engineering or Software Engineering, and so a method for measuring the capability of applicants is required so that ISS can select the most suitable candidates. The MTech entrance test is a set of questions designed to test the capability of candidates applying either for the Knowledge Engineering or Software Engineering Masters Course. The entrance test will take about one hour, and will consist of about fifty multiple-choice questions. It is intended to validate the academic capability of applicants. Specifically the test consists of three sections, where,

- Section 1 assesses the candidates basic IT knowledge, in particular,
  - The candidates IT management skill,
  - The candidates IT programming skill,
  - The candidates understanding of IT infrastructure issues,
  - The candidates understanding of IT technology.
- Section 2 assesses the candidates' mathematical capability, in particular their ability to understand problems in a simple form using mathematical symbols and models and to then solve these problems.
- Section 3 examines the candidate's reasoning/ logical capability and the candidates' English language skills. In particular it assesses
  - The candidate's ability to detect patterns and sequences in data and their ability to extrapolate from this.
  - The candidate's ability to understand complex process and to create simple models or logical expressions that represent these processes.
  - The candidate's ability to understand and use technical English language.

The test will take place during the recruitment period between September and November and will be held at ISS during a weekday evenings, or Saturday afternoons.

Candidates who need to take this test will be contacted after their application forms have been submitted to ISS and then assessed by ISS. The test results will be assessed by ISS and used to determine the candidates' suitability for the MTech course. The assessment criteria used to evaluate the test results will be strictly confidential, but as a guide, candidates will,

- Achieve minimum scores in each of the above sections.
- Achieve a high score overall.

**Please note that ISS will not communicate the results of the entrance test to the candidate.** To aid in preparation for this test, a sample set of questions has been prepared and is given below

## 2. Sample Set of Questions

### 2.1. Basic IT Knowledge

#### 2.1.1 IT Management

1. Risk transfer is practiced when a development of a complex and difficult software component is subcontracted to an external software development organization. Which of the below factors do you believe is most important in determining if the risk transfer will be successful?
  - (a) The external software development organization is contractually committed to deliver the difficult software component.
  - (b) The external software development organization has ISO9001-2000 certification.
  - (c) The external software development organization has sufficient funds to compensate you if they cannot deliver the software component.
  - (d) The external software development organization has completed similar projects in the past.
  - (e) The external software development organization has assured you that it can successively complete this work.
3. Which of the following may be a valid reason for re-estimating the project cost and schedule during the execution of a project?
  - (a) The on-going collection of metrics within the project that will help determine the actual productivity of the project.
  - (b) Implementing agreed software changes.
  - (c) Identifying defects within the software that will need to be fixed pre-release.
  - (d) Staff taking unanticipated vacations or sick leave.
  - (e) All of the above are valid reasons for re-estimating.

### 2.1.2 Programming

1. Which one of the following is a loop construct that will always be executed once?
  - (a) for
  - (b) switch
  - (c) while
  - (d) do...while
  
2. How many times will the following loop execute?  
for(j=1; j<=10; j=j-1)  
{ }
  - (a) 1
  - (b) 10
  - (c) Never
  - (d) Forever
  
3. A syntax error is signaled by the
  - (a) compiler.
  - (b) linker.
  - (c) editor.
  - (d) run time system.

### 2.1.3 IT Infrastructure

1. Which of the following best describes a network operating system?
  - (a) Hardware needed for the operation of a network.
  - (b) A configuration of devices to support network operation.
  - (c) Software used to protect microcomputers on a network from virus infection.
  - (d) Software that controls network communications and the sharing of resources.
  
2. Serial and parallel transmission:
  - (a) Differ in whether the bits are on separate wires or all on one.
  - (b) Differ in how many bits are transferred per character.
  - (c) Are widely used in synchronous and asynchronous systems respectively.

### 2.1.4 IT Technology

1. Which of the following are true about Firewalls? (Select all that apply)
  - (a) Filters network traffic.
  - (b) Can be either a hardware or software device.
  - (c) Follows a set of rules.
  - (d) Can be configured to drop packets.
2. A team has been engaged to design and develop software to control the manufacturing processes of a factory making spare parts for off-road vehicles. The team needs to understand and document the processes undertaken in the manufacture of the spare parts. Which documentation technique would be most appropriate?
  - (a) A storyboard.
  - (b) A data dictionary.
  - (c) A system flowchart.
  - (d) A data flow diagram.

### 2.2. Mathematical Capability

1. The relation between distance ( $d$ ), time ( $t$ ) and average speed ( $s$ ) is expressed as  $d = s \cdot t$ . If both  $s$  and  $t$  are positive, and  $s$  is constant, and  $t$  decreases, then
  - (a)  $d$  decreases only if  $s$  is greater than  $t$ .
  - (b)  $d$  increases only if  $s$  is greater than  $t$ .
  - (c) There is no change in  $d$ .
  - (d) increases regardless of the size of  $r$  and  $t$ .
  - (e) decreases regardless of the size of  $r$  and  $t$ .
2. Suppose a company places  $F$  dollars each month in an employees CPF account. This amount  $F$  is determined by multiplying the employee's salary  $S$  by a fixed rate  $X\%$ . Suppose in month 1 the employee earns  $S$ , in month 2 he also earns  $S$ , but in month 3 his salary is increased by  $Z\%$ . How much will be paid into his CPF account over these three months ?
  - (a)  $3 \cdot S \cdot X / 100$
  - (b)  $3 \cdot Z \cdot X \cdot S / 100$
  - (c)  $3 \cdot Z \cdot X \cdot S / 10000$
  - (d)  $(3 + Z / 100) \cdot S \cdot X / 100$
  - (e)  $(2 + Z / 100) \cdot S \cdot X / 100$

### 2.3. Logical/deductive Reasoning/Verbal Meaning

1. Which of the following words is closest in meaning to the word *Bias*?

- (a) Direction.
- (b) Compulsion.
- (c) Pre-disposition.
- (d) Impartiality.
- (e) Mandatory.

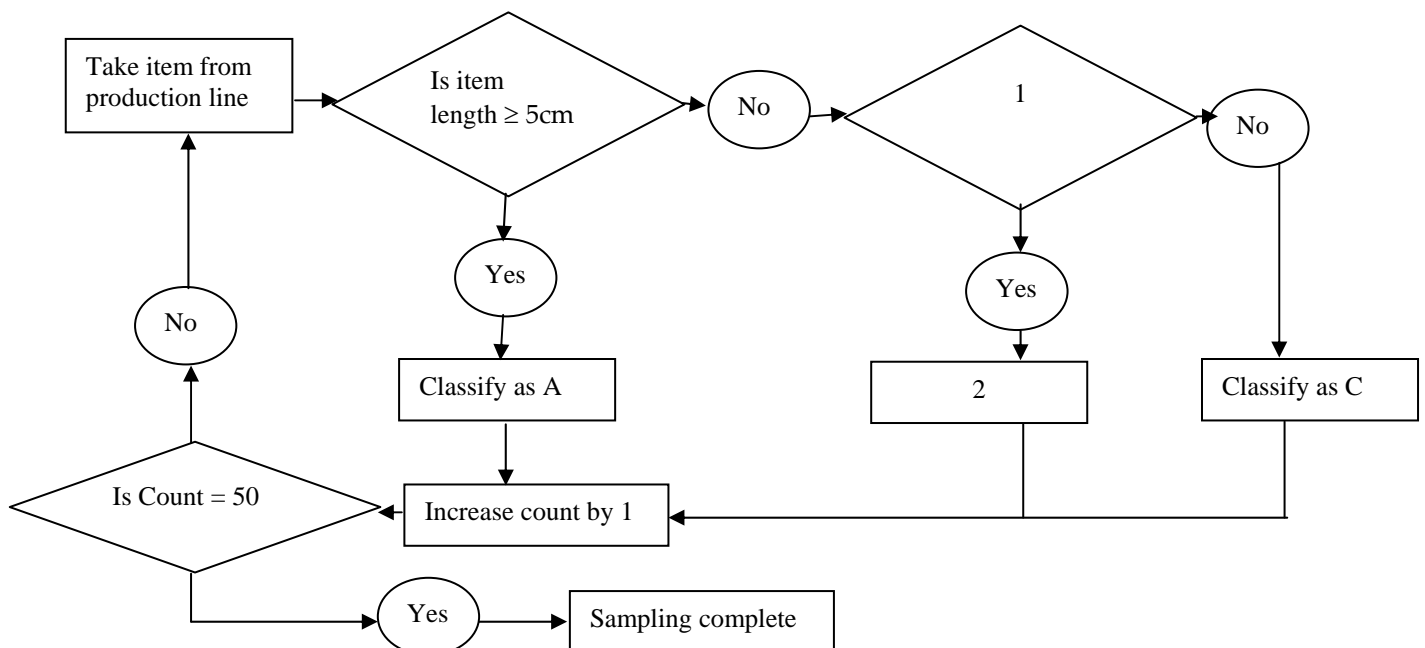
2. What is the next letter in the following sequence?

C, A, K, R, M V, M, V, K, R, \_

- (a) A
- (b) B
- (c) C
- (d) M
- (e) R

3. The below diagram represents the processing of a set of items from a production line. 50 items must be taken from the production line and then classed as

- Class A : Item length  $\geq 5\text{cm}$
- Class B:  $5\text{cm} > \text{Item length} \geq 4\text{cm}$
- Class C Item length  $< 4\text{ cm}$



3.1 What would be the condition in box 1?

- (a) Is item length  $\geq 5\text{cm}$ .
- (b) Is item length  $\leq 5\text{cm}$ .
- (c) Is item length  $< 4\text{cm}$ .
- (d) Is item length  $\geq 4\text{cm}$ .
- (e) Is item length  $> 5\text{cm}$ .

3.2 What would be the statement in box 2?

- (a) Classify as B.
- (b) Classify as C.
- (c) Classify as A.
- (d) Take item from production line.
- (e) Classify as B or C.