

**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**FACULTY OF THE BUILT ENVIRONMENT**  
**BACHELOR OF QUANTITY SURVEYING (HONOURS) DEGREE**  
**PART IV SECOND SEMESTER EXAMINATIONS - MAY 2014**  
**MEASUREMENT IV – AQS 4204**

**TIME:** 3 Hours

**TOTAL MARKS:** 100

**INSTRUCTIONS:**

Answer **all** questions in Section A and **any two** questions in Section B.  
Candidates are allowed to scale dimensions in Section A drawings.

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**SECTION A**

**Question 1**

Using Fig 1 and Fig 2 provided, prepare a bill of quantities for all electrical items that will be used for tendering purposes. [30 marks]

**Question 2**

Fig 3 shows the ground floor layout of a building. Prepare a bill of quantities of all electrical items as shown on the drawing that will be used for tendering purposes. [20 marks]

**SECTION B:**

**Question 3**

(a) Discuss the three segments of the combustion triangle, as used in fire protection and fighting fire in built environments. [9 marks]

(b) The Single Burning Item (SBI) Test is one of the experimental methods used to rate the burning speed of building construction materials, especially when considering the application of certain quantities of passive fire protection strategic units on a construction project. Figure QU 3 below shows the physical set-up of the Single Burning Item (SBI) Test. Explain the procedure of the SBI Test clearly discussing the measured parameters from the burning test experimental process. [16 marks]

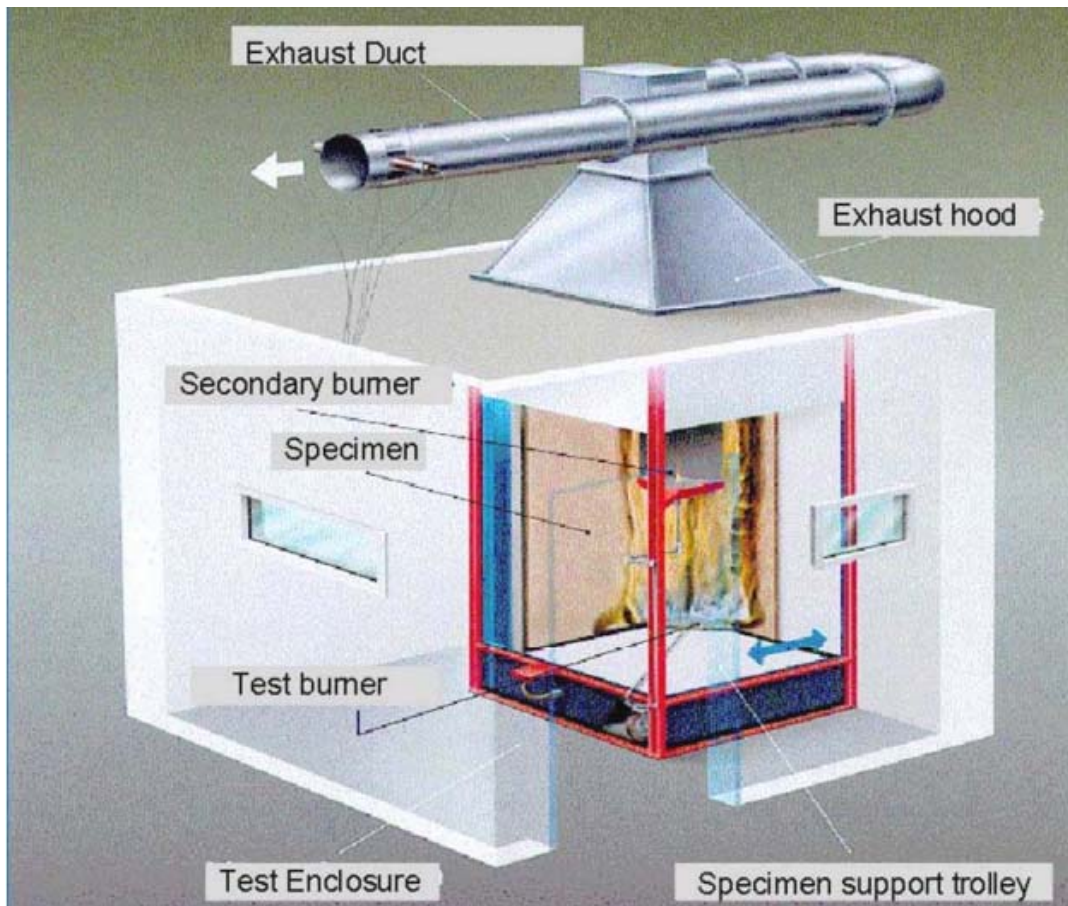


Figure QU3 The SBI Test set-up.

#### Question 4

##### Building Measurements Extraction and Quantification & Costing of Material Bills

The diagrams in Figure 4(a and b) represent the plan views of a two storey building, respectively at each floor level. The shaded areas represent the Circulation Area of the building by floor where transportation facilities and related material will be positioned, at each floor level.

##### Required:

(a) Using a scale of 1 mm: 5 m in physical measurements extraction, determine the Circulation Area of the building by floor as a percentage of the gross floor space for the whole two storey building.

(b) Rental charges are pegged at US\$5.00/m<sup>2</sup> of floor space per each calendar month in the building. It is charged on the whole area floor space except the circulation area. Determine how much rental is charged to a tenant occupying this building for a leasing period of Five (5) years. [25 marks]

### **Question 5**

Modern escalator systems, for providing transportation in built environments, operate under the S.O.D concept in order to enhance energy economy on the transportation infrastructure in buildings.

- (i) Explain what is meant by the term S.O.D as used on escalator transportation systems on buildings. [3 marks]
- (ii) How does a S.O.D system based escalator function? [4 marks]
- (iii) Identify and explain the two basic S.O.D based escalator systems [6 marks]
- (iv) Briefly discuss how else energy consumption may be minimized with the employment of the transportation technology of escalators and elevators in built environment. [12 marks]

### **Question 6**

Correct system sizing requires considering many factors other than simply reading the nameplate of the existing unit.

- (a) Explain, briefly, the key factors considered for correctly sizing a heating and cooling system in built environments. [6 marks]
- (b) Outline the General rules for duct designing in Air-conditioning systems installation. [4 marks]
- (c) What are the main testing requirements and procedures which must be followed as well as the measuring tools which must be used, in order to ensure that a HVAC system had been properly installed on a built high rise residential or office building? [10 marks]
- (d) With the aid of sketches explain any five ducting configuration systems used in installing air-conditioning dust systems on built environments. [5 marks]

**END OF EXAMINATION**