

SIR ARTHUR LEWIS COMMUNITY COLLEGE  
DIVISION OF TECHNICAL EDUCATION AND MANAGEMENT STUDIES

EXAMINATION SESSION : May 2013 Final Examination

TUTOR (S) : Ms. C. Charles

PROGRAMME TITLE : Carpentry & Joinery – Part II  
Building Services

PROGRAMME CODE : 3BS-CJ2-CE  
3BD-BSF2- CE

**COURSE TITLE** : **Building Science and Materials**

COURSE CODE : BLS103

CLASS (ES) : Year two

DATE : Monday 13<sup>th</sup> May, 2013

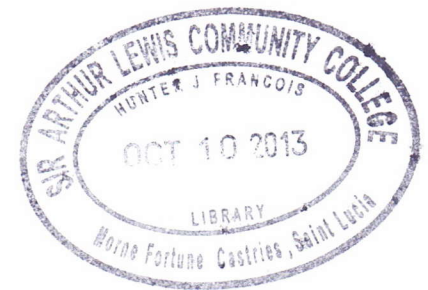
COMMENCEMENT TIME : 1:00 p.m.

DURATION : 3 hours

INVIGILATOR (S) : **P. Jn Francois** M. St. Clair, L. Ollivierre

ROOM (S) : TRB-L1/L2

#B31

**INSTRUCTIONS:**

This examination paper contains three (3) sections.

**Section A** – Long answer question; this section contains four (4) questions. Students must answer all questions.

**Section B** – True / False; this section contains ten (10) questions. Students must answer all questions.

**Section C** – Multiple Choice; this section contains ten (10) questions. Students must answer all questions.

- Please number your responses accurately.
- Students are advised to use a pen to write this examination.
- Write your ID Number on *each* answer sheet.
- All cell phones must be turned off during the examination.
- **Note:** Bags, books as well as writing paper not given by the invigilator should be deposited at the front of the examination room or as otherwise indicated.
- Students must sign **IN** and **OUT** on the examination class list.

### Section A: Long Answer

Read each question carefully and answer the following questions on answer paper provided. Students must answer All FIVE (5) questions in this section.

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1. A train travelling at 80 m/s acceleration uniformly to 110 m/s in 2 minute and continues accelerating uniformly at 110 m/s for another 3 minutes. Draw the velocity time graph and from this graph determine (i) the acceleration, and (ii) the total distance travelled during this acceleration. (20 marks)
  2. A car starting from rest with uniform acceleration reaches a velocity of 10 m/s in 10 s and travels with this velocity for 20s. it then decelerates steadily and comes to rest 50s after starting.
    - a. Draw a velocity time graph
    - b. Find the acceleration
    - c. Find the deceleration
    - d. Calculate the total distance travelled (20 marks)
  3. A horizontal lightweight beam rests on two supports namely point A and point B. Draw the diagram which best represents the information below and calculate the magnitude of the reactions forces at point A and B.  
The beam is simply as loaded as follows;  
9N - 4m away from point A  
5N - 10m away from point b  
Total length of the beam is 18m (20 marks)
  4. The supply of heat energy to a material can produce a number of effects. List, explain and give an example of the SIX effects of heat when applied to a material (20 marks)
  5. Calculate the total heat required to convert 4kg of ice to water at 80 °C completely to steam at 100 °C. (Given the specific heat capacity of water =4200J/kg°C and the specific latent heat of vaporization of water =2260KJ/kg). (20 marks)

### Section B: True and False

Read each question carefully and answer the following questions on answer paper provided. Students must answer all questions in this section.

Each question is worth 1 mark

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1. All materials exist in one or more of the three states or phases of matter and they are Gas, Vapor and Liquid State. T/F
  2. Are all of the following listed are considered to be a force; Speed Mass Energy Weight T/F
  3. Kinetic & Potential Energy are these two types of Mechanical Energy. T/F
  4. An example of **Convection** is "Water boiling in a kettle." T/F
  5. A Force (F) causes a change in either shape or the motion of a body. The Unit of measurement is Grams. T/F
  6. Total heat lost by hot substance =Total heat gained by cold substance. T/F
  7. Work (W) = Force x Distance moved in direction of the force. Therefore the unit of measurement is Square feet. T/F
  8. All materials exist in one or more of the three states or phases of matter; one of which is Solid Liquid Gas T/F
  9. Sensible Heat is heat which causes a change in temperature. T/F
  10. Heat can be transferred by these three methods; Conduction, Convection and Radiation T/F



### Section C: Multiple Choice Questions

This section contains 10 questions. Read each question carefully and answer the following questions on answer paper provided. Students must answer all questions. Each question is worth 1 mark

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1. A hand force of 20 N is applied to a spanner. Calculate the turning effect produced on the nut if the spanner has a turning effect of 400mm.  
a) 8.7. Nm  
b) 7.87 Nm  
c) 2.41 Nm  
d) 8 Nm
  2. Calculate the density of the ice in a block which has a mass of 2760 kg and a volume of  $3\text{m}^3$ .  
a)  $19.20\text{ kg/m}^3$   
b)  $290\text{ kg/m}^3$   
c)  $920\text{ kg/m}^3$   
d)  $1920\text{ g/m}^3$
  3. Calculate the volume of 50kg of plastic, given the density of the plastic is  $1250\text{kg/m}^3$   
a)  $1.24\text{ m}^3$   
b)  $0.1\text{ m}^3$   
c)  $0.04\text{ m}^3$   
d)  $4.0\text{ m}^3$
  4. Calculate the work done when a force of 20N pushes a body a distance of 1 km in the same direction as the force  
a) 20 KJ  
b) 29 J  
c) 2,000,000 J  
d) 0.2 KJ
  5. A car moves from rest in a fixed direction with a uniform acceleration of  $2\text{m/s}^2$ . Calculate the velocity the car has reached in 10 s.  
a) 0.20 m/s  
b) 20 m/s  
c) 120 m/s  
d) 10 m/s
  6. A force of 200N acts on a body of 5kg mass. Calculate the acceleration produced on the body.  
a)  $40\text{m/s}^2$   
b)  $0.4\text{m/s}^2$   
c)  $14\text{m/s}^2$   
d)  $18\text{m/s}^2$
  7. A train steadily changes velocity in a certain direction from 10 m/s to 30 m/s during a time of 1 minute. Calculate the distance travelled in this time.  
a) 200m  
b) 1200m  
c) 84m  
d) 1.4m
  8. Calculate the quantity of heat required to raise the temperature of 6kg of water from  $10^\circ\text{C}$  to  $25^\circ\text{C}$ . (Given the specific heat capacity of water is equal to  $4200\text{J/kg}^\circ\text{C}$ ).  
a) 738,000 KJ  
b) 37.8 KJ  
c) 8.3 KJ  
d) 7.38 KJ
  9. Calculate the weight of a bolder having a mass of 60kg. (Given  $g = 9.8\text{ m/s}^2$ )  
a. 587 N  
b. 654N  
c. 588N  
d. 76N
  10. A spring within its elastic limit gives an extension of 60mm with a load of 40 N. Calculate the extension produced by a load of 16 N .  
a) 28mm  
b) 62N  
c) 8N  
d) 24mm
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**END OF EXAMINATION**