

POLITEKNIK
Jabatan Pengajian Politeknik

EXAMINATION AND EVALUATION DIVISION
DEPARTMENT OF POLYTECHNIC EDUCATION
(MINISTRY OF HIGHER EDUCATION)

CIVIL ENGINEERING DEPARTMENT

FINAL EXAMINATION
JUNE 2012 SESSION

CA104: MATERIALS FOR BUILDING CONSTRUCTION
DATE : 19 NOVEMBER 2012 (MONDAY)
DURATION : 2 HOURS (11.15 AM - 1.15 PM)

This paper consists of **FOURTEEN (14)** pages including the front page.

SECTION A : OBJECTIVES (25 QUESTIONS – ANSWER ALL)

SECTION B : ESSAY (4 QUESTIONS – ANSWER 3 ONLY)

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BY THE CHIEF INVIGILATOR**

(The CLO stated is for reference only)

CONFIDENTIAL

CA 104: Materials For Building Construction

SECTION A

OBJECTIVES (25 marks)

Instruction: This section consists of 25 questions. Write your answers in the answer booklet.

1. Determine the standard size of brick ... [CLO 1]
 - A. 230 mm x 110 mm x 76 mm
 - B. 240 mm x 115 mm x 71 mm
 - C. 228 mm x 107 mm x 69 mm
 - D. 215 mm x 102.5 mm x 65 mm

Question 2 refers to Figure 1

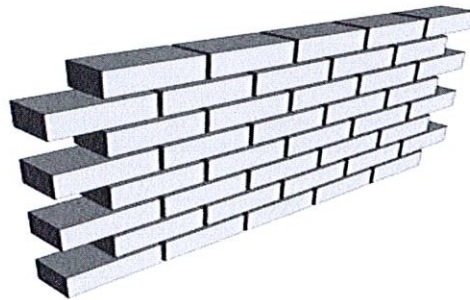
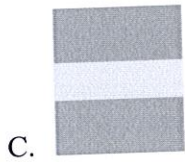
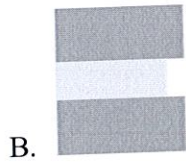
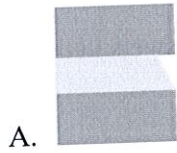


Figure 1

2. Figure 1 above is the commonest bond used today and the least interesting in appearance known as ... [CLO 1]
 - A. English bond
 - B. Stretcher bond
 - C. Header bond
 - D. Flemish bond

3. Which one is the weather joint that easily sheds water from a wall surface?..[CLO 1]



4. In building construction, brick can be used as ...(CLO 2)

- i. Load bearing wall
- ii. hardcore
- iii. arch
- iv. column

- A. i, ii and iii
- B. ii, iii and iv
- C. i, iii and iv
- D. i, ii, iii and iv

- made from refractory or fire clay
- fire resistant
- dense and smooth but easy to break
- use to construct the boiler or furnace

5. All the facts above can be referred to : (CLO 2)
- A. Engineering brick
 - B. Fire brick
 - C. Common brick
 - D. Marl brick
6. Bricks are produced from clay. Choose the characteristics of clay in bricks making.
[CLO2]
- i. Easy to set up and operate during the work process
 - ii. Consist of large and small aggregates in the clay content
 - iii. Not have much shrinkage during heating or burning.
 - iv. There are many organic substances
- A. i and ii
 - B. iii and iv
 - C. i and iii
 - D. ii and iv

'Originally used for single brick walls, called 1/2 brick walls it became the obvious choice for cavity walls as less cutting brick were required.'

7. The statement refers to :

- A. Stretcher bond
- B. Flemish bond
- C. English bond
- D. Header bond

8. Types of concrete are listed below **except** ... [CLO1]

- A. in situ concrete
- B. pre stressed concrete
- C. pre cast concrete
- D. in site concrete

9. Types of rock commonly used as aggregates are listed below **except** ... [CLO1]

- A. Granite
- B. Claystone
- C. Sandstone
- D. Limestone

10. Characteristics of cement are ... [CLO1]
- A. cohesive and adhesive
 - B. porosity
 - C. shrinkage
 - D. absorption
11. Define cement ... [CLO2]
- A. product obtained by grinding clinker formed by burning raw material
 - B. product obtained by grinding aggregates formed by burning raw material
 - C. product obtained by crushing granite formed by burning raw material
 - D. product obtained by crushing slate formed by burning raw material
12. What are the effects of water cement ratio? [CLO2]
- i. high water cement ratio makes it easy to work with the concrete
 - ii. too wet makes a concrete bleeding and segregation will occur and will decreased cohesion.
 - iii. If concrete is too dry, it will be difficult to compact
 - iv. Accurate same water cement ratio, mortar is stronger than concrete
- A. i and ii
 - B. i, ii and iii
 - C. ii, iii, and iv
 - D. i, ii, iii and iv

13. Properties of water are ... [CLO2]

- i. it should be potable example fit for drinking purpose
- ii. free from acids or alkalis or other such organic impurities.
- iii. Free from iron, vegetable matter or any other substances.
- iv. Salt water is recommended.

- A. i and ii
- B. i, ii and iv
- C. i, ii and iii
- D. ii, iii and iv

14. Retarding admixtures are related to ... [CLO2]

- i. added to accelerate the setting and early strength development of concrete
- ii. the use of retarder may reduce the strength at early age
- iii. recommended in large structures and difficult situations.
- iv. Hot weather increases the rate of hardening process which makes it difficult to place and finish the plastic concrete.

- A. i, ii and iii
- B. ii, iii and iv
- C. i,iii and iv
- D. i, ii, iii and iv

15. Wood is classified into two categories, namely hard wood and soft wood. Based on your knowledge, which of the following woods are in the category of heavy hardwood. [CLO1]

- i. Merbau
- ii. Tembusu
- iii. Meranti
- iv. Getah

- A. ii and iii
- B. iii and iv
- C. i and ii
- D. i, ii and iii

16. Hardwood can be divided into 3 categories which are heavy hardwood, medium hardwood and light hardwood. Between those 3, which one is NOT a characteristic of heavy hardwood. [CLO1]

- A. Broadleaf
- B. Shelled seeds
- C. Seeds without skin
- D. Grows in tropical and moderate conditioning

17.

It is influenced by soil, climate and the place where trees grow. Types of defects often occur, such as rags, books, scarring or liver and hollow.
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The statements above refer to... [CLO2]

- A. Defects due to insects
 - B. Defects due to seasoning
 - C. Defects due to natural forces
 - D. Defects due to fungi
18. All of the following statements are true about chipboard, **except..** [CLO2]
- A. High-density chipboard is often used for kitchen cabinets
 - B. Used as the main material in the construction of building structures framework
 - C. A veneered surface is widely used for flat-pack furniture and work surfaces
 - D. It is often used for kitchen tops and fire doors.
19. The following terms describe the properties of steel, **except ...** [CLO1]
- A. Elastic
 - B. Strong
 - C. Ductile
 - D. Very malleable
20. Fastening two pieces of metal together by softening with heat and applying pressure is called: ... [CLO2]
- A. Welding
 - B. Bending
 - C. Course
 - D. Riveting

21.

<ul style="list-style-type: none">▪ Biological compatibility▪ 45% lighter than steel▪ Widely used in making accessories and prosthetic devices
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Which one of the ferrous metals below referring to the above statement? [CLO2]

- A. Aluminum
 - B. Zinc
 - C. Titanium
 - D. Wrought iron
22. Among the properties of glass are ...[CLO 1]
- I. limestone
 - II. sodium sulphite
 - III. dolomite
 - IV. broken glass
- A. II,III and IV
 - B. I,II and III
 - C. I,II and IV
 - D. I,II,III,IV

23. Non-metal materials are produced from ...[CLO 2]
- A. Organic materials
 - B. Petroleum
 - C. Limestone
 - D. Sodium sulphite

24. Which one of the answer is **NOT** the product selection criterion for green building? (CLO 2)
- A. Indoor air quality
 - B. Recourse Efficiency
 - C. Energy Efficiency
 - D. Greater cost
25. Which of the followings are the basic steps needed before making a green building product selection? (CLO 2)
- A. Evaluation – Research - Selection
 - B. Research – Evaluation – Selection
 - C. Selection – Evaluation – Research
 - D. Research – Selection - Evaluation

ESSAY (75 marks)

Instruction: This section consists of FOUR (4) essay questions. Answer THREE (3) questions only.

QUESTION 1. [CLO2]

- a) Sketch a full size of brick together with its dimensions. (3 marks)
- b) Sketch an isometric view for the following terms:
i. Stretcher bond
ii. English bond (10 marks)
- c) State **three (3)** important principles of brick bonding in order to gain a strong and durable construction (6 marks)
- d) Bricks have been used for at least five thousand years ago and still are the most popular construction materials in building walls column floors, stairs, road and others. Based on your knowledge, state **three (3)** properties that shown bricks are a good material in construction industries. (6 marks)

QUESTION 2

- a) State **TWO (2)** functions of water in concrete mixture. (4 marks)
- b) State **THREE (3)** advantages of pre-cast concrete. (6 marks)
- c) Sketch in isometric concrete components in a construction of a building. (6 marks)
- I. Arch
 - II. Post and beam
 - III. Pile cap and ground column
- d) State the following use of concrete mix ratios (9 marks)
- I. 1 : 1 1/2 : 3
 - II. 1 : 2 : 4
 - III. 1 : 5 : 10

QUESTION 3

- (a) Define wood defect. (CLO 2) (4 marks)
- (b) Explain the following timber product :
- i. Plywood (8 marks)
 - ii. Glued Laminated Timber (8 marks)
- (c) Describe **FIVE (5)** purposes of wood drying .(CLO2) (5 marks)

QUESTION 4

- (a) Sketch a standard hot-rolled section in isometric view for :
- i. Universal beam
 - ii. Structural tee
 - iii. Angle
- (CLO2) (7 marks)
- (b) There are a wide ranges of ferrous and non-ferrous metals used in building construction. List down **four (4)** usages of aluminium. (CLO2)
- (8 marks)
- (c) List **five (5)** benefits of green building product to the building's occupants. (CLO2)
- (10 marks)