SIR ARTHUR LEWIS COMMUNITY COLLEGE

FACULTY OF ENGINEERING

ACADEMIC YEAR (2024/2025) – SEMESTER TWO

END OF SEMESTER EXAMINATION

LECTURER(S)	**:**	**Miss Crescentiana Charles**
PROGRAMME TITLE	**:**	**Carpentry and Joinery – Foundations**
COURSE TITLE	**:**	**Building Science IA**
COURSE CODE	**:**	**BLS101**
LEVEL	**:**	**Certificate/Year Ones**
PAPER	**:**	**One**
DATE	**:**	**Wednesday 30th April, 2025**
COMMENCEMENT TIME	**:**	**1:00 p.m.**
DURATION	**:**	**Two (2) hours**
INVIGILATOR(S)	**:**	**D. Thompson (Chief), D. Boulogne, J. Estephane, O. Richards, E. Hunte**
ROOM(S)	**:**	**OTW-1R-08**

GENERAL INFORMATION AND INSTRUCTIONS

- This paper consists of Three (3) Sections. All questions must be attempted on the foolscap provided.
- **Section A** contains Forty- Five (45) Multiple Choice Questions. You are required to answer all questions. One mark is awarded for each correct answer.
- **Section B** contains Fifteen (15) True or False Questions. You are required to answer all questions. Two marks are awarded for each correct answer.
- **Section C** contains One (1) Long Answer Question. You are required to answer this question. Marks are awarded accordingly.
- Students must sign **IN** and **OUT** on the examination class list.
- Students must **not** write their names on their answer sheets, only their ID number.
- Students are reminded to read **all** questions and instructions in each section very carefully.
- Please number your responses accordingly.

DO NOT TURN THIS COVER SHEET UNTIL

YOU ARE TOLD TO DO SO!!!

SECTION A: Multiple Choice Questions

Answer all questions. (One mark will be awarded for each correct answer)

1. Which one of the following is essential for the prevention of dry rot in suspended timber ground floors?

A) Treatment of timber over site concrete
B) Over-site concrete and damp proofing
C) Through ventilation and damp proof course
D) Sleeper walls and honeycombing

2. From the table below select the nonferrous metals

Metals			
A	**B**	**C**	**D**
Copper	Nickel	Alloys	Copper
Lead	Copper	Brass	Zinc
Iron	Zinc	Copper	Bronzes
Steel	Tin	Bronzes	Iron

3. The best method for testing for the correct amount of water in a concrete mix is by using?

A) Structure test
B) Slump Test
C) High water content test
D) All of the above

4. Timber is classified as hardwood or softwood according to its

A) Structure
B) Durability
C) Workability
D) Weight

5. Cement stored on site must be

A) Protected from frost
B) Prevent from bulking
C) Used within 2 days
D) Kept dry

6. Which of the following timber is most commonly used for floor joist in domestic dwelling?

A) Mahogany
B) Pitch pine
C) Cedar
D) Oak

7. Traditional timber should have a moisture content of approximately 20% in order to

A) Reduce expansion / contraction to a minimum
B) Enable ease of cutting and working
C) Prevent splitting during nailing
D) Make sure it does not absorb water

8. Which of the following defects occurs in timber?

A) Corrosion
B) Decay
C) Waney edge
D) Cutting

9. What is the most common factor that reduces the strength of timber?

A) Sapwood
B) Defects
C) A high cellulose content
D) Not sufficient acid content

10. Which of the following methods would be used for joining copper in a domestic water supply?

A) Brass union
B) Capillary fitting
C) Soldering joints
D) Brazed joints

11. Of the following listed below which is not a method of sawing timber

A) Through and through sawn
B) Quarter cut sawn
C) Pass through sawn
D) Billet sawn

12. Select the correct definition of "hydration" as it pertains to Concrete

A) The general principle of mixing water
B) The chemical process when the cement absorbs the water
C) The pliability of the concrete
D) None of the above

13. Common furniture beetle attack on timber can be identified by

A) A ticking sound
B) Small holes in the timber
C) White threads spreading across the surface
D) Shrinkage between brown flakes

14. A plasticizes are added to cement mortar when rendering in order to act as a?

A) Filler
B) Strengthening agent
C) Damp proof membrane
D) Wetting agent

15. The aggregates in a concrete mix should be well graded in order to:

A) Provide dense concrete
B) Reduce the time for compacting
C) Improve the work ability of the concrete
D) Reduce the amount of cement needed

16. Which one of the following primers should be used on galvanized steel?

A) Zinc chromate
B) Red oxide
C) Aluminum
D) White lead

17. To prevent timber from being destroyed by insect attack it should be

A) Coated with glass water
B) Painted with synthetic paints
C) Pressure impregnated with a starch solution
D) Pressure impregnated with copper sulphate

18. Organic impurities in concrete are likely to:

A) Improve work-ability
B) Impair the strength of the concrete
C) Increase the density of the concrete
D) Increase the amount of material needed to strengthen the concrete mix

19. Concrete is described as in-situ if it is

A) Mixed on the site
B) Pre-cast and fixed on the site
C) Cast in final position
D) Placed in form work

20. Concrete test cubes help to determine the strength of concrete in testing

A) Tensile strength
B) Compression stresses
C) Expansion conditions
D) Impact loading

21. Heat treatment of iron and zinc powder is known as;

A) Sand blasting
B) Annealing
C) Sulphonating
D) Sherardizing

22. What is meant by rough cast?

A) The wood grained appearance of an in situ concrete wall
B) A finish coat with a concrete texture
C) An external rendering undercoat
D) An exposed aggregate finish

23. Which of the following is **not** a form of grade testing for timber?

A) Ball testing
B) Stress grading
C) Visual stress grading
D) Machine stress grading

24. The strength of a structural concrete made with Ordinary Portland Cement is based on the compressive strength at 28 days. What proportion of the 28day strength is normally available at 7 days?

A) 20%
B) 49%
C) 100%
D) 60%

25. Ordinary Portland cement used in concrete foundations can be subjected to breakdown under chemical action as a result of,

A) Concentration of sulphate in ground water
B) The addition of calcium chloride
C) Frost action
D) The presence of nitrates in the soil

26. The basic difference between Ordinary Portland cement and rapid hardening cement is that rapid hardening cement:

A) Hardens much faster
B) Contains more gypsum
C) Is grounded more finely
D) Has a higher lime content

27. What is meant by the bulking of sand?

A) Delivery by loads of $3m^3$ or more
B) Increasing the volume by including relatively large grains
C) Particles held apart by the surface tension of the water in the sand
D) Sand with 4-6% of silt present

28. Which one of the following materials would require 'curing' before being used in building?

A) Clay bricks
B) Hollow clay bricks
C) Concrete blocks
D) Clay quarry tiles

29. Which one of the following listed below is not a structural timber member?

A) 2"x4"x 20'
B) 1"x3"x16'
C) 2"x 8"16'
D) 4"x4"x 18'

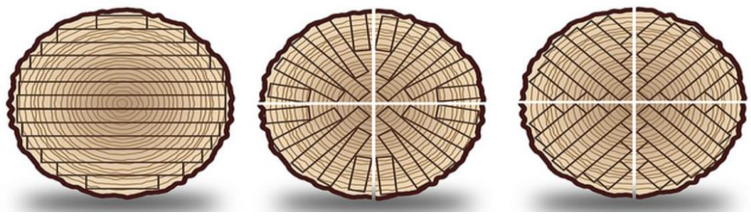
30. One of the considerations in the formula for the minimum reinforcement cover is?

A) Concrete and reinforcement must be exposed
B) Diameter should be approximately 100mm
C) Compression stresses of material is 50%
D) It should be twice the diameter of the bar and at least 25mm

31. The bearing capacity for a brick pier that supports the load from part of the upper floor, wall and roof of a two-story building is 70kN. The soft clay ground has a bearing capacity of 52 KN/m^2. Calculate the area of the foundation.

A) 1.346 m^2
B) 0.74 m^2
C) 3640 m^2
D) 122 m^2

32. The diagrams shown below indicates which method of timber conversion.



A) Through and through; Lapped sawn, Slab sawn
B) Tangential sawn, Natural sawn, Dovetail sawn
C) Radial sawn, Tangential sawn. Slab sawn
D) Dovetail sawn, Match tangential sawn, Radial sawn

33. What types of soils are poor for building on?

A) Loam, clay sand and rock
B) Rock, Gravel, Loose loam
C) Sand. Clay, Silt
D) All of the above.

34. Multiple bonding of carbon is found in the molecular structure of?

A) Cement
B) Steel
C) Glass
D) Plastic

35. From the list below indicate which are hardwoods?

Types of Woods			
a	**b**	**c**	**d**
Cedar	Red Alder	King Wood	Copper
Maple	Black Ash	Hickory	Pitch Pine
Red Pine	Brazilian Walnut	Cypress	Bronze
Red Spruce	Mahogany	Fir	Sweet Birch

36. Which one of the following factors does not affect the strength of hardened concrete?

A) Water-cement ratio
B) Compaction
C) Aggregate cement ratio
D) Volume of concrete

37. The term ‘weathering’ when applied to a timber window sill refers to the?

A) Capillary groves
B) Drip throwing
C) Splay on the upper surface
D) Water bar

38. In concrete for a floor, which one of the following will most effectively reduce the percentage of voids?

A) A high water content
B) Good grading of fine and course aggregates
C) Controlled temperature and humidity during curing
D) Use of all-in aggregates.

39. Which is the correct formula to calculate the water/cement ratio of a concrete mix?

A) Total weight of water in the concrete mix / eight of cement
B) Weight of cement / Total weight of water in concrete
C) Weight of cement and water / Weight of cement
D) All of the Above.

40. What will be the best solution when mortar is mixed with too much water?

A) Add more sand
B) Add more cement
C) Add more Lime
D) None of the Above

41. Leveling the concrete even to the top of the forms by dragging a wooden board across it is called?

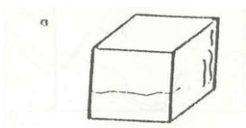
A) Screening
B) Jointing
C) Floating
D) Edging

42. What does the ratio 1:3:6 Mix means?

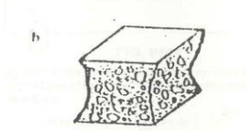
A) A high water content
B) 1 volume of cement: 3 volumes of fine aggregate: 6 volumes of course aggregate
C) 1 volume of water: 3 volumes of course aggregate: 6 volumes of cement aggregate
D) 1 volume of fine aggregate: 3 volumes of cement aggregate: 6 volumes of water aggregate

43. Which one of the following sketches shows a normal cube failure?

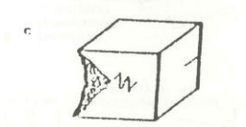
A)



B)

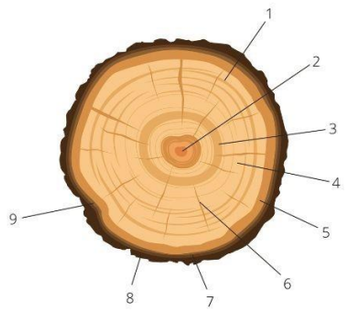


C)



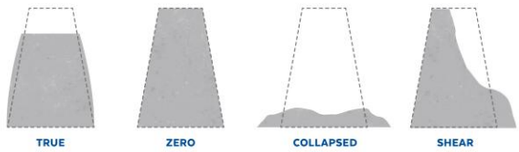
D)

44. The diagram below shows the anatomy of a tree. From the diagram below select the best possible answer for the numbers, 1, 2,4, and 6.



A) (1)Tree rings, (2) Core (4) Sapwood (6) Core Rays
B) (1)Tree rings, (2) Cork (4) Bast (6) Kernel
C) (1)Tree rings, (2) sapwood (4) Bark (6) Core Rays
D) None of the Above.

45. The diagram below give the an accurate account of



A) An Ice cream cone melting
B) Grading of fine and course aggregates
C) Method used for testing Concrete
D) All of the Above

SECTION B: True or False

Answer all questions. (Two marks will be awarded for each correct answer)

1. Are all of the following listed considered to be forces; Speed, Mass, Energy and Weight

2. Tension is a force which tends to stretch a material.

3. An example of objects under compression is; Springs being pulled.

4. The materials listed are ductile materials Gold, Copper and Glass.

5. Rivets holding plates together is an example of materials reacting in Shear Force.

6. A Force (F) causes a change in either shape or the motion of a body.
The Unit of measurement is grams.

7. Work (W) = Force x Distance moved in direction of the force.
Therefore the unit of measurement is Square feet. (sq.ft.)

8. A chemical reaction always produces new substances.

9. An element is a substance which cannot be separated into anything simpler.
It is done by a process called radiation.

10. A steam engine driving a dynamo that lights a bulb is an example of work being done?

11. Is Copper an element on the periodic table?

12. Air content tests are carried out on heavy concrete structures to determine how they react under air pressure.

13. Knots in timber will affect the seasoning of the timber.

14. The standard sheet of plywood measures 4’-0” x 8’-0”

15. Permeability is a term used to denote the property of allowing water to enter the voids in a material.

SECTION C: Long Answer Questions

Answer the following questions. (Marks are awarded accordingly)

Question 1.

A) A block of ice has the following properties.
Mass = 3450 kg
Volume = 6 m^3

Calculate

I. The density of the block of ice
II. The relative density of the block of ice
III. The area of the block given the length of the block is 200 cm by 300 cm by 100 cm (give answer in meters squared m^2.
Given the density of the water =1000 kg/m^3.

(12 marks)

B) Figure 2.2 shows the force diagram of two structures. (1) Redraw the diagrams and (2) complete them by adding the different types of forces that are acting on each structure.

(7 marks)

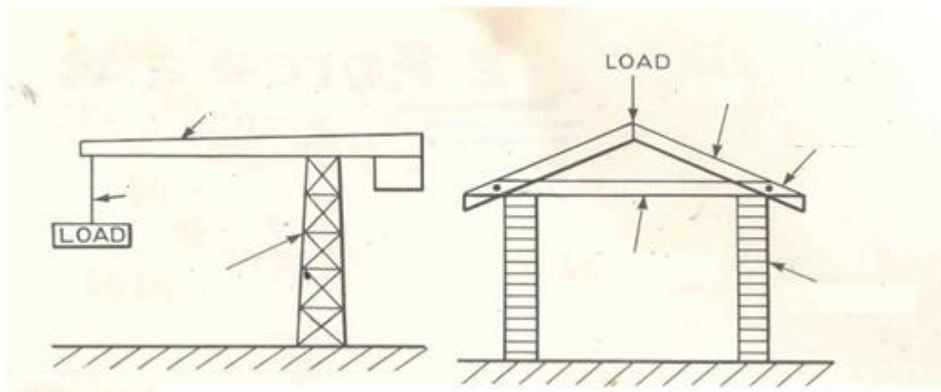


Figure 2.2

C) When a final load of 120 N is applied to steel spring its produces an extension of 80 cm without exceeding the elastic limit of the spring. Calculate the weight of the object when hung from the same spring produces an extension of 60 cm.

(6 marks)

Total (25 marks)

END OF EXAMINATION!!!