

**UNIVERSITY OF SWAZILAND**  
**Faculty of Health Sciences**  
**DIPLOMA IN ENVIRONMENTAL HEALTH**  
**FINAL EXAMINATION PAPER 2005**

- TITLE OF PAPER** : BUILDING CONSTRUCTION TECHNOLOGY
- COURSE CODE** : EHS 206 PART (A) MULTIPLE CHOICE
- DURATION** : 2 HOURS
- MARKS** : 100
- INSTRUCTIONS** :
- : THIS PAPER CONTAINS 100 QUESTIONS
  - : ANSWER ALL QUESTIONS.
  - : USE A PEN TO COMPLETE ALL PARTS OF THE ANSWER BOOK PROVIDED
  - : EACH QUESTION CARRY 1 MARK.
  - : EACH QUESTION SHOWS FOUR POSSIBLE ANSWERS (LETTERED a b c d)
  - : DECIDE WHICH ONE IS CORRECT AND CIRCLE IN THE APPROPRIATE QUESTION NUMBER ON YOUR ANSWER BOOK WITH A PEN
  - : IF YOU DECIDE 'C' IS CORRECT, ENCIRCLE THE APPROPRIATE LETTER LIKE THIS  
1.    a.  
      b.  
       c.  
      d.
  - : IF YOU WANT TO CHANGE YOUR ANSWER, CANCEL YOUR FIRST CHOICE, THEN CIRCLE THE ONE THAT YOU HAVE NOW DECIDED TO CHOOSE
  - : ANY CALCUALTIONS OR ROUGH WORK MUST BE DONE ON THE QUESTION PAPER, CALCULATORS MAY BE USED BUT THEY MUST BE SILENT AND NON-PROGRAMMABLE.
  - : NO PAPER SHOULD BE BROUGHT INTO NOR TAKE OUT OF THE EXAMINATION ROOM.

**DO NOT OPEN THIS QUESTION PAPER UNTIL PERMISSION IS GRANTED BY THE INVIGILATOR.**

- Q1. The function of a crown in a tree is to:
- Provide rigidity
  - Provide a two way system for moisture traveling up from the root and sap traveling down from the crown
  - Provide as large a catchment area as possible covered with leaves which contain chlorophyll
  - Absorb moisture-containing minerals from the soil for transfer via the trunk to the crown.

- Q2. The term moisture content of timber means:
- The quantity of moisture contained by the timber expressed as a percentage of its dry weight
  - The quantity of moisture contained by green timber
  - The amount of moisture found in the timber when it is subjected to damp conditions
  - The amount of moisture found in the felled trunk

- Q3. Wet rot may occur in timber that is:
- Excessively dry
  - Excessively wet
  - Partially dry
  - Partially wet

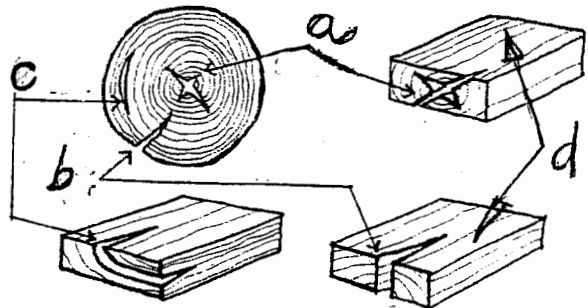
- Q4. Natural defects in timber occur:
- Due to changes in moisture content
  - Due to unsound practice in the use of milling techniques or to undue economy in attempting to use every possible piece of timber converted from the trunk

- In the form of twisted grain, cross-grain or spiral grain, all of which can induce subsequent problems of distortion in use
- During the growing period

- Q5. In timber technology, the term timber preservation means:
- The treatment of timber with preservatives
  - Covering the timber with DPM sheets
  - Storing the timber under controlled humidity
  - Storing the timber inside a shed

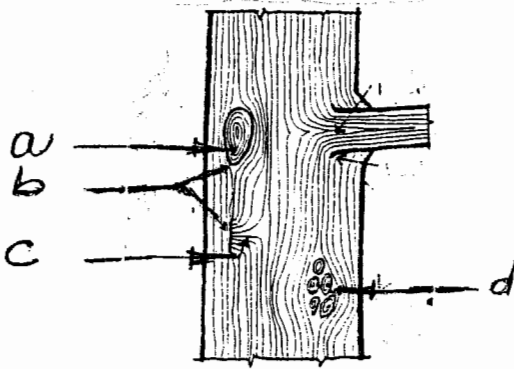
- Q6. Stress grading in timber technology is referred to as the process by:
- Which individual pieces of timber is preserved
  - Which individual pieces of sawn structural timber are sorted into grades to which strength values are assigned for each species
  - Which structural pieces of timber are and sawn are seasoned in a kiln
  - Which green timber is stacked with lath or stickers between the timbers to allow the passage of air and assist in the evaporation of moisture from the timber

- Q7. In fig 1, which arrows indicate a cup or ring shake as a form of growth defect?

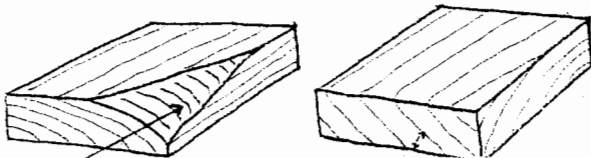
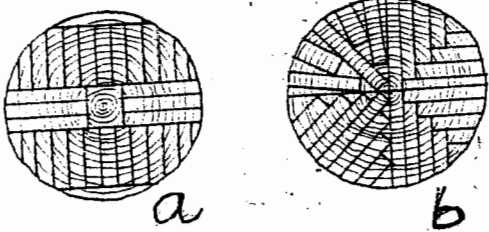


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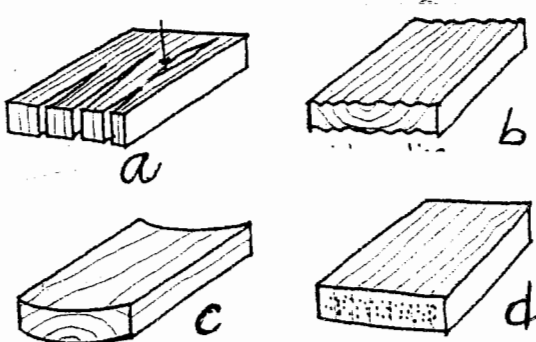
Q8. In the longitudinal section which arrow indicates a natural defect known as a dead knot.



Q9. Timber Defects can occur during the conversion which of the following sketches indicates a wane defect on the timber



Q10. The following sketches indicates defects that may occur during the process of timber seasoning which of the sketch illustrates a cupping defect



Q11. Which of the following methods of timber preservation is by far the most efficient and controllable method of preservation

- a. Open tank application
- b. Brush application
- c. Pressure application
- d. Deluging, dipping or steeping

Q12. Which of the following statement best define the term "seasoning of timber"?

- a. A distortion in converted timber causing departure from its original plane.
- b. Drying out the free water and some of the water from the walls, leaving the timber with the specified moisture content.
- c. A process of keeping 'green' timber with large quantities of free water.
- d. A process of removing all the moisture contents in the timber.

Q13. Moisture content can be expressed as:

- a. The quantity of moisture contained by the timber expressed as a percentage of the dry weight.
- b. The quantity of free water contained by the timber expressed as a percentage of the water in the timber cells.
- c. The dry weight of timber over the weight of air seasoning.
- d. The weight of timber over the weight of kiln seasoning.

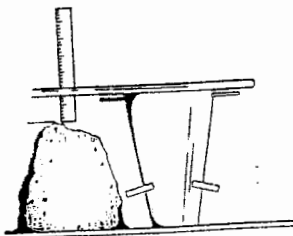
Q14. In timber technology stress grading is referred to as:

- The strength of 'green' timber
- The physical characteristics of timber
- The process by which individual pieces of sawn structural timber are sorted into grades to which strength values are assigned for each species.
- The process by which individual pieces of sawn structural timber are preserved.

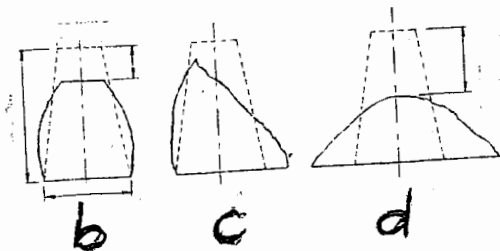
Q15. In concrete technology, workability of fresh concrete can be defined as:

- The ease with which a concrete mix can be handled from the mixer to its finally compacted stage
- Concrete that is with too much water
- Concrete that is with too little water
- Concrete with no water

Q16. Which of the following types of slumps is a shear slump:



a



b

c

d

Q17. Grading of aggregate means:

- The particles in a load of aggregates are about the same size
- All particles in a load of aggregate are of various group sizes
- All particles in a load of aggregate are uniform
- All particles in a load of aggregate are of the same weight

Q18. Bulking of sand means:

- The amount of moisture in the sand
- The dry sand
- The marked percentage increase in volume of sand when moist
- The amount of fine and coarse aggregate in a mix

Q19. Which of the following concrete tests measure the distance that concrete compacted into a cone will slump down when the cone is lifted from it:

- Slump test
- Compacting factor test
- Vebe test
- Flow test

Q20. Concrete is weak in resisting which type of strength:

- Tensile strength
- Compressive strength
- Cube strength
- Bond strength

Q21. Concrete is strong in resisting which type of strength:

- a. Tensile strength
- b. Compressive strength
- c. Cube strength
- d. Bond strength

Q22. Hydration of any cement means:

- a. The hardening stage of cement
- b. The evaporation of water from the cement
- c. The reaction between the cement and water
- d. The reaction between cement and aggregate

Q23. Which of the following concrete mix is recommended for mass concrete:

- a. 1: 2: 4
- b. 1: 3: 6
- c. 1: 6: 3
- d. 1: 4: 2

Q24. Which of the following concrete mix would you recommend to be used for concrete with reinforcement?

- a. 1: 3: 6
- b. 1: 2: 4
- c. 1: 6: 3
- d. 1: 4: 2

Q25. Concrete is compacted in order to:

- a. Make it dense
- b. Make it uniform
- c. Remove entrapped air and fill voids
- d. Make it watertight and displace coarse aggregates

Q26. To cater for tensile strength in concrete works, reinforcement rods are placed at:

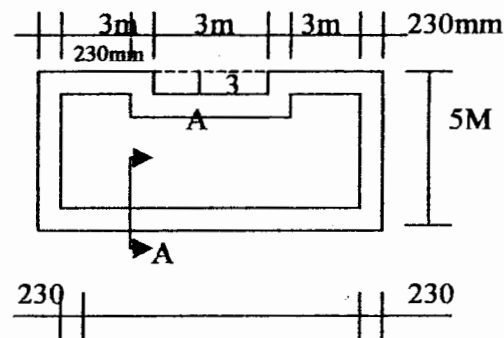
- a. Top of the concrete slab with concrete cover
- b. Middle of the concrete slab with concrete cover
- c. Bottom of the concrete slab with concrete cover
- d. Ends of concrete slab with concrete cover

Q27. Column A, in the dimension paper is a:

- a. Squaring column
- b. Description column
- c. Dimension column
- d. Timesing column

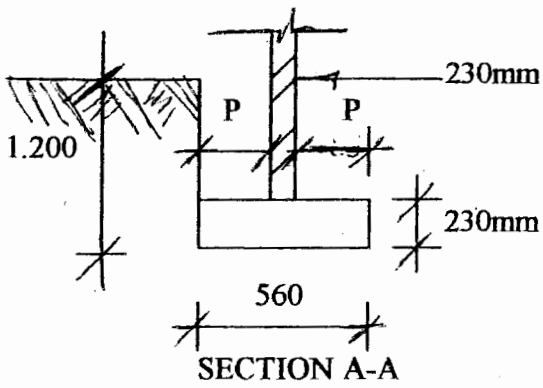
A	B	C	D	A	B	C	D

Q28. The centerline or girth of figure 1 is:



PLAN of fig.1

- a. 34.920
- b. 28.920
- c. 16.000
- d. 30.920



Q29. Which of the building materials in the section represents a hardcore:

- a.
- b.
- c.
- d.

Q30. It may be advantageous in certain situations to colour materials in section drawing before taking it to city council for approval for further clarity. The general accepted colour for concrete is:

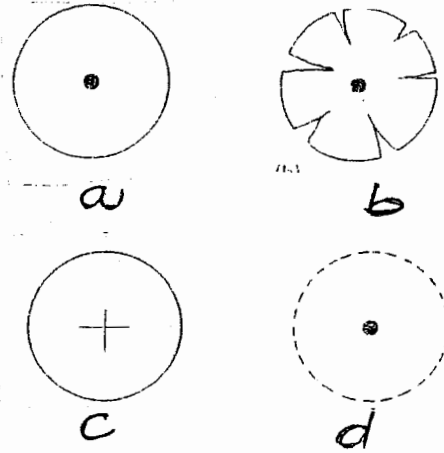
- a. Red
- b. Green
- c. Brown
- d. Blue

Q31. The purpose of a North point on a drawing is to:

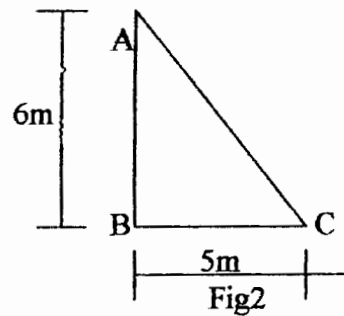
- a. Identify the site with its surroundings
- b. To locate the site with its features
- c. To show the position of north in relation to the plan of a site or a building

d. To show the position of north in relation to the roads, existing trees to be removed, new trees to be planted, fence with gate, hedge, ponds, rivers and proposed contours.

Q32. Which of the following symbols represents a new tree:



Q33. The length of line AC in fig 2 is:



- a. 7.812 M
- b. 7.810 M
- c. 7.801 M
- d. 8.720 M

Q34. Diagonals in setting-out are checked for:

- a. Correct measurement of length and breadth of the dimensions
- b. To ensure the squareness of the building

- c. To ensure that the lengths of the buildings are parallel
- d. To ensure that the breadths of the building are parallel
- Q35. Building regulations require that projections of walls on strip foundation concrete should be:
- Less than 150mm
  - Not less than 150mm
  - Less than the width of the foundation
  - Equal to the width of the foundation
- Q36. A building line can be defined as:
- An imaginary line fixed by the builder, where by no building may project above it
  - An imaginary line fixed by the design team, where by no building may project above it
  - An imaginary line fixed by the local authority as a statutory line in terms of dimensions beyond which no way project
  - As the frontage of the building
- Q37. Temporary benchmark can be defined as:
- A fixed point for getting out a building
  - A fixed base line for setting out a building
  - A fixed point on site to which all levels are related and should be established at an early stage.
  - A fixed based line on site to which all setting out dimensions are related and should be established at an early stage
- Q38. Profile boards in setting out are used for:
- Marking the length and breadth of the building
  - Marking the wall thickness and foundation width as well as for keeping these marks during excavation up to the laying of the first course
  - Measuring the diagonals
  - Marking the foundations width only.
- Q39. When setting-out a rectangular building its corners should be:
- 180°
  - 360°
  - 90°
  - 45°
- Q40. The area of brickwork is 30m<sup>2</sup>. The brick size measures 215mm X 102.5mm X 65mm. How many bricks are to be ordered allowing 5% for cutting and waste:
- 214
  - 225
  - 228
  - 215
- Q41. The area of brickwork is 30m<sup>2</sup>. There are 60 bricks in one square metre of a stretcher bond. How many bricks are to be ordered:
- 1800
  - 900
  - 2100
  - 8100

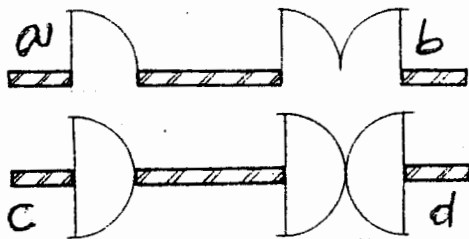
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- Q42. The area of soil stripping for fig 1 is:
- 51.181
  - 50.181
  - 48.201
  - 46.622
- Q43. Utilizing the information on fig 1, what is the volume of the excavation for the foundations?
- 12.280
  - 12.918
  - 13.280
  - 13.000
- Q44. What is the volume of concrete in the foundation of fig 1 allowing 2½% for wastage and shrinkage?
- 2.179
  - 3.818
  - 3.214
  - 2.918
- Q45. How many floor tiles are to be ordered for the floor area of fig 1. One ceramic floor tile measures 300mm X 300mm:
- 469
  - 500
  - 468
  - 390
- Q46. Which of the following drawing instrument is used for drawing vertical and inclined lines:
- T- squares
  - Scales
  - Set squares
  - Drawing board
- Q47. Which of the following drawing instrument is used for measuring or for setting out angles:
- Protractor
  - Curves
  - Pencil
  - Dividers
- Q48. Which drawing instrument is used for alterations, corrections and the removal of unwanted pencil lines?
- Template
  - Pens and stencils
  - Brushes
  - Erasers
- Q49. Which statement best defines a section?
- A working drawing used to provide vertical views through the building to show method of construction
  - A working drawing used to show external appearance of all faces and to identify doors and windows
  - Working drawing used to identify and set out parts of the building such as rooms, corridors, doors, windows etc.
  - Working drawing used to locate site, buildings; define site levels, indicate services to buildings etc
- Q50. Which is the recommended scale for a ground floor plan:
- 1: 1000
  - 1: 100
  - 1: 50
  - 1: 1

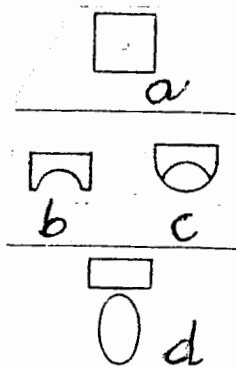


- Q51. A sketch can be defined as:
- Working drawings consisting of plans, sections and elevations
  - A form of projection in which length, breadth and height of the object are shown on one drawing
  - A draft or rough outline of an idea, it can also be a means of depicting a three-dimension guise
  - A draft produced with no plan, no elevation and no section

- Q52. Which of the following doors illustrates a double door double swing:



- Q53. Which of the following symbols illustrates a bowl:



- Q54. An object drawn in an isometric projection with its

horizontal and inclined axes should have an angle of:

- 180°
  - 90°
  - 60°
  - 30°
- Q55. Which of the following scales, illustrates an object drawn to its full size:
- 1: 100
  - 1: 20
  - 1: 1
  - 1: 5

- Q56. A Straight flight stair type can be defined as:

- A stair that changes direction 90° to the left or right by means of either a quarter-space landing or tapered steps.
- A stair that reverses its direction through 180° normally by a half-space landing.
- A stair that utilize in one direction for the entire length.
- A stair that utilize newels to change direction and also to terminate and support the outer strings.

- Q57. The standard size of a brick with mortar is:

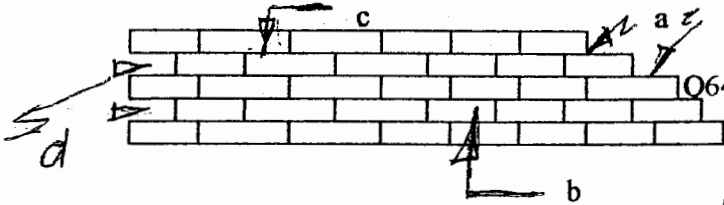
- 215 X 102.5 X 65mm
- 215 X 65 X 103mm
- 225 X 102.5 X 75mm
- 225 X 112.5 X 75mm

- Q58. In figure 3, d is known as:

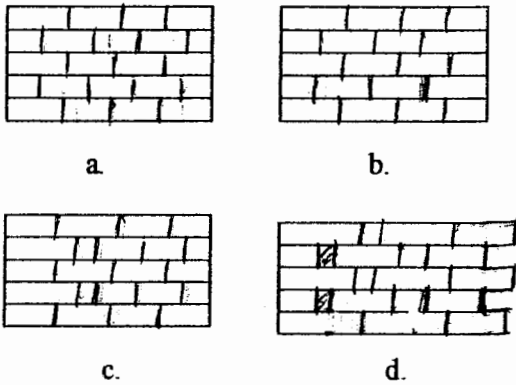
- Toothing
- Racking back
- Queen closer
- Half bat

Q59. In figure 3, A is known as:

- a. Courses
- b. Toothing
- c. Racking back
- d. Three quarter bat



Q60. In figure 4, which sketch illustrates a Flemish bond



Q61. The minimum height of DPC level above original ground level is:

- a. 300mm
- b. 230mm
- c. 150mm
- d. 690mm

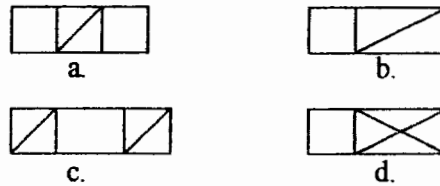
Q62. The abbreviation R.W.P. stands for:

- a. Rainwater pipe
- b. Reinforced wash projection
- c. Rodding water push
- d. Royal water personnel

Q63. The abbreviation V.P. in the construction industry stands for:

- a. Vice principal
- b. Vent pipe
- c. Voluntary personnel
- d. Very important person

Q64. Which of the following graphical symbols is for a bed:



Q65. What type of foundation would be recommended on sloping site?

- a. Strip foundation
- b. Wide strip foundation
- c. Stepped strip foundation
- d. Deep strip foundation

Q66. Which of the above foundation in Q65 would be recommended in shrinkable clay soil:

Q67. The primary aim in the design of foundations should be:

- a. To spread the loads from the building over sufficient area of soil to avoid undue settlement
- b. To spread the load from the building over sufficient area of soil to promote undue settlement
- c. To promote settlement of the building

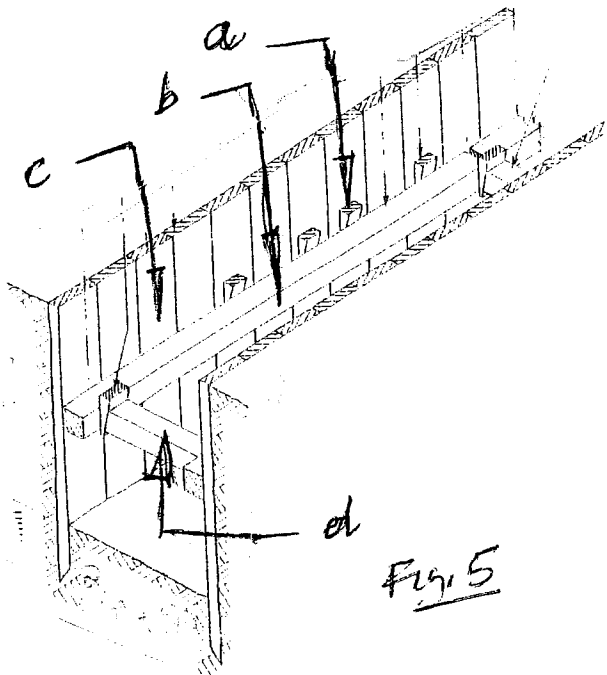
d. To increase uneven settlement

Q68. In reinforced concrete works the reinforcement is placed about 25mm up from the bottom of the concrete lintel and the ends are often hooked to provide:

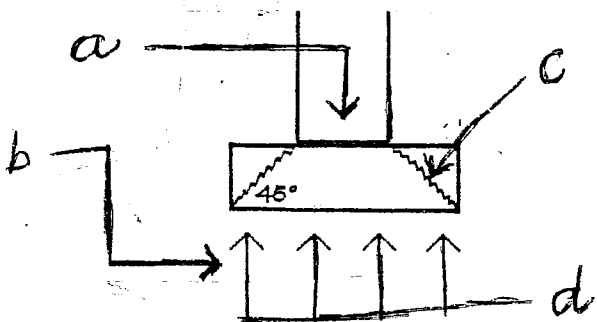
- a. Compression
- b. Tension
- c. Grip
- d. Bond

Q69. In fig 5 below which is a waling:

Q70. In fig 5 sketch which is a strut:



Q71. Which arrow indicates a shear failure on the foundation below?



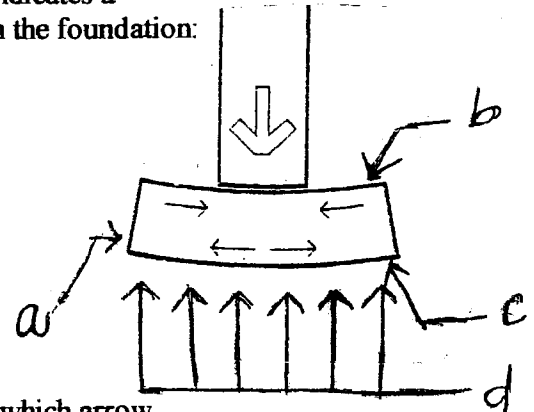
Q72. The minimum thickness of a strip foundation is:

- a. 230mm
- b. 200mm
- c. 150mm
- d. 300mm

Q73. Topsoil can be defined as:

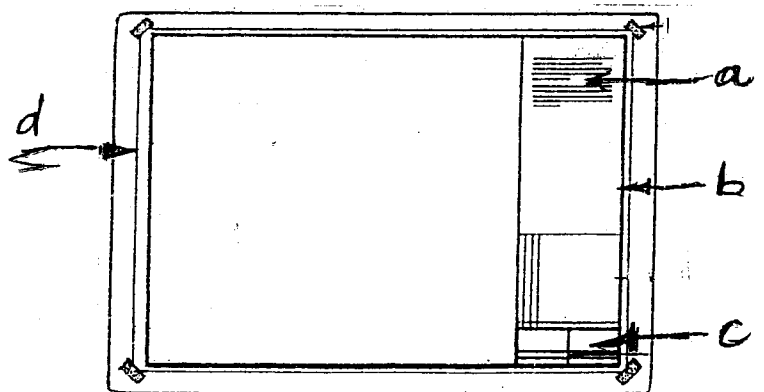
- a. A natural deposit of the finest silicon's and aluminous products of weathering rock
- b. Soil composed of loose soil, growing plant life and the accumulation of decaying vegetation
- c. Sands and gravels consist of the coarser largely siliceous unaltered products of weathering rock
- d. A natural coarse grained deposit of rock fragments and finer sand

Q74. Which of the following arrows on the sketch indicates a tension load on the foundation:

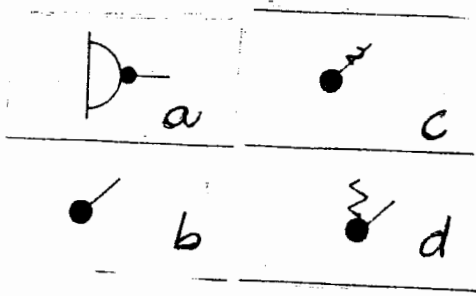


Q75. In fig 6 below which arrow indicates a 20mm boarder for filing:

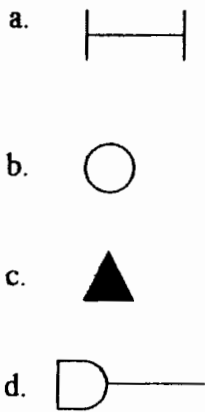
Q76. In fig 6, which arrow indicates a Title block?



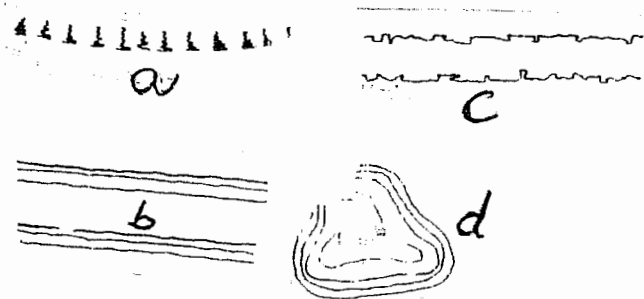
Q77. Which of the following components illustrates a two-way lighting switch:



Q78. Which of the following components illustrates a fluorescent lamp:



Q79. Which of the following landscape and survey symbol represents a river



Q80. Which of the following working drawings represent external faces of a building including windows and doors:

- a. Plan
- b. Section
- c. Elevation
- d. Isometric project

Q81. Which one of the following forms of communication would be the BEST when required to urgently issue working instructions from Head Office management to site staff?

- a. By telephone
- b. Verbally by management following a prompt site visit
- c. Word processed document on company headed paper sent by post
- d. Fax on company headed paper signed and dated.

Q82. Which of the following computer software packages would be BEST used in order to produce scale drawings to be used on-site?

- a. Hand processing
- b. Spreadsheets.
- c. CAM.
- d. CAD.

Q83. The MAIN method used by the architect to communicate ideas and designs to the builder is

- a. Telephone messages.
- b. Drawings, plans and details
- c. Manufacturer's information sheets
- d. Video tapes

Q84. The primary function of a window is:

- a. To reduce the number of bricks or blocks to be used.
  - b. To provide an opening on the wall
  - c. To admit light and air into a room
  - d. To provided a pleasant appearance of the wall.
- Q85. A stepped strip foundation is adopted on
- a. A flat level
  - b. Undulating or sloping sites
  - c. Man-made grounds
  - d. Formation levels ground
- Q86. Substructure work can be defined as
- a. All partition walls with openings
  - b. All structure below the dpc level of a house
  - c. All roofs, windows, doors and ceiling
  - d. All structure above the dpc including internal and external features
- Q87. Sleeper walls are
- a. External load bearing walls build of brickwork
  - b. Retaining walls built to retain falling earth on embankments, built with weep holes to drain off water
  - c. Partitioning walls built to divide rooms in a building
  - d. Dwarf walls built in suspended ground floors, to support the floor joists. Often built with holes through it for the free circulation of fresh air within the floor.
- Q88. Which of the following statements must a dpm layer not be?
- a. Impermeable to water
  - b. Tough enough to remain undamaged when laying the concrete slab
  - c. Continuous with the dpc in adjoining walls
  - d. Permeable to water
- Q89. The block plan is used to identify
- a. Selective information which locates component elements and assemblies within a building should be included on a floor plan
  - b. Detailed information in respect to the site as a whole
  - c. The amount of information contained on the drawing
  - d. The site in relation to the surrounding roads, buildings, geographical features etc.
- Q90. A schedule is
- a. Small drawings giving arrangements
  - b. Written documents with specific requirements for materials and workmanship
  - c. Collation of similar standard items in accordance to the drawings information
  - d. Written documents in accordance with SMM
- Q91. When designing and selecting a foundation it is necessary to
- a. Know the water table
  - b. Calculate the loads on the foundation and determine the nature of the subsoil and

- ground water level, changes and the possibility of the ground soil movement
- c. Calculate the number of walling units plus the roof and its covering
- d. Know the type of cement to be used and the amount of salt in the soil

Q92. A two-storey house with a load of 50kN per metre run on the foundation is to be built on soil with a bearing capacity of 80kN/m<sup>2</sup>. The minimum width of the foundation should

- a. 625mm
- b. 690mm
- c. 500mm
- d. 590mm

Q93. A retaining wall measures 14m long and its height is 2.700m. There are 8 blocks in one square metre. How many blocks are to be ordered to build the wall, allowing 5% for cutting and wastage?

- a. 303 blocks
- b. 319 blocks
- c. 403 blocks
- d. 419 blocks

Q94. Cement stored on site must be

- a. Protected from frost
- b. Prevented from bulking
- c. Used within seven days
- d. Kept dry.

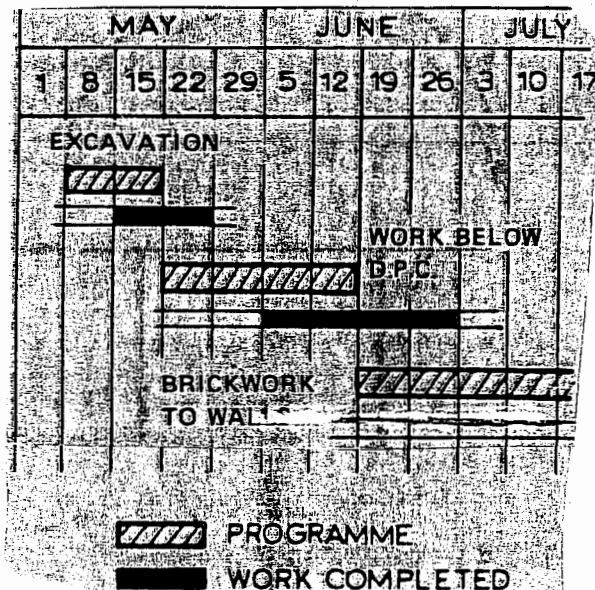
Q95. The building line referred to in setting out building, is an imaginary line that

- a. Marks the centre of the road

- b. Determine the position of the face of the building
- c. Marks the outer perimeter of the building site
- d. Is set at right angle to the line of the road

Q96. The programme chart shows part of a programme and progress chart on a pair of semi-detached houses. From the progress chart on July the work is

- a. As programmed up to schedule
- b. Two weeks ahead of schedule
- c. One week behind schedule
- d. Two weeks behind schedule



Q97. In a drawing office curves can be drawn by:

- a. A French curve or by a flexible ruler
- b. A scale ruler or by a straightedge
- c. A T-square or by a beam compass
- d. A spring bow or by pump compass

- Q98. When setting out a building, diagonals are checked for:
- a. All sides dimensions to be correct
  - b. All end walls to be equal
  - c. The squareness of the building
  - d. The use of the 3:4:5 rule of thumb method
- Q99. Suspended ground floors in timber are well ventilated in order to:
- a. Prevent spore germination
  - b. Maintain constant humidity
  - c. Increase thermal insulation
  - d. Provide under floor flue-draught.
- Q100. Concrete cube specimens are usually crushed after:
- a. 28 days after casting
  - b. 10 days after casting
  - c. 14 days after casting
  - d. 1 day after casting