5.4 BUILDING CONSTRUCTION (446)

5.4.1 Building Construction Paper 1 (446/1)

1. (a)	**Definition of building.** A relatively permanent enclosed construction over a plot of land having a roof, doors and windows. It is used for human habitation and other human activities.	**(2 marks)**
(b)	**Components of a business plan.** - Executive summary. - Business description. - Financial information. - Product and services. - Sales and marketing. **Any 4 x ½ =**	**(2 marks)**
2. (a)	The first three steps in setting out the site. - Establish a baseline. - Set out the main lines, marked with start pegs. - Check for right angles. **3 x 1 =**	**(3 marks)**
(b)	**Factors that determine the type of finish to use in a building.** - Cost of the finish. - Availability of materials to use for finishing. - Intended use of the building. - Degree of protection required. - The desired appearance (aesthetics). **Any 4 x ½ =**	**(2 marks)**
3. (a)	**Reasons for using safety wear.** Attire that cover the legs. - Protection from protruding objects. - Protection from welding sparks and pieces of masonry. - Keeping off dirt from the legs - Protection from spills from paint or slurry. **Any 2 x 1/2 =**	**(1 mark)**
(b)	**Eye googles when cutting bricks using a wet machine saw.** - Protection from stone particles that fly off. - Protection from water sprays. - Protection from dirt and grit that may enter the eye. - Protection from broken saw particles. **Any 2 x 1/2 =**	**(1 mark)**
4. (a)	**Functions of materials in concrete.** **Cement:** It binds the different particles of material together.	

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(b)	**Water:** It makes the mixture easy to place and spread. It also starts off the chemical action referred to as setting which enables concrete and/or mortar to harden.	
(c)	**Coarse aggregate:** Provides strength and volume. The stronger the aggregate used, the stronger the concrete produced. **3 x 1 =**	**(3 marks)**
5. (a)	**Functions of foundations** - To support the building. - To transfer the weight of the building to a firm base in the ground. - To provide a level on which the walls are built. - To cover soft or weak areas in the firm base. **Any 3 x 1 =**	**(3 marks)**
(b)	**Circumstances under which pile foundations are preferred.** - When the natural bearing capacity of the soil is low. - In areas where the water table is high. - In places where there is presence of layers of highly compressible subsoils such as peat. - In subsoils which may be subject to moisture movement or plastic failure. **Any 3 x 1 =**	**(3 marks)**
6. (a)	A flat roof is a roof with a pitch less than 10° while a pitched roof is a roof with a pitch between 10° and 75°. **2 x 1 =**	**(2 marks)**
(b)	**Functional requirements of a roof:** - It should safely resist all imposed loads such as snow and wind. - It should be capable of accommodating thermal and moisture movements. - It should be durable to give satisfactory performance and keep the costs of maintenance to minimum. **3 x 1 =**	**(3 marks)**
7.	**Purpose of damp proofing:** - To prevent the penetration of moisture from below (rising dampness). - To prevent the penetration of moisture from above. - To prevent the penetration of moisture from horizontal entry. **3 x 1 =**	**(3 marks)**
8. (a) (b) (c)	**Terms used in scaffolding:-** - Ledger is a horizontal member onto which the transom is fixed. - Transom is the transverse horizontal member onto which the platform rests. - Brace is the cross member fixed unto the standards to strengthen them. **3 x 1 =**	**(3 marks)**

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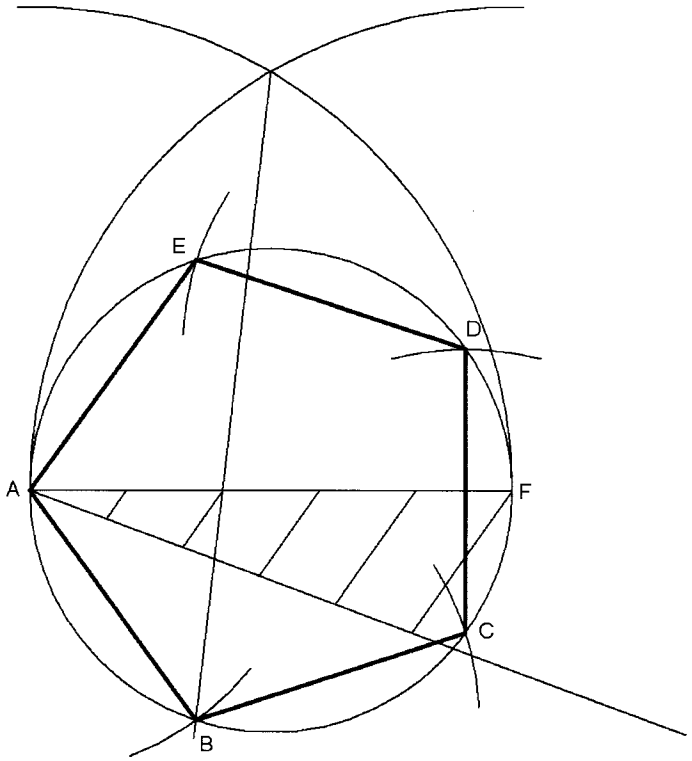
9.	**Terms used in arches**	
(a)	Abutment is the part of the wall on which the arch is supported.	
(b)	Springer is first unit adjacent to the screw-back of the arch.	
(c)	Voussoir is the wedge-shaped units that are bounded to form the arch.	
(d)	Crown is the voussoir/unit at the highest point of the arch.	
	4 x 1 =	**(4 marks)**

10.



- Division of diameter into 5 parts – 1
- Arcs whose radius = diameter 2 x ½ = 1
- Joining intersection of arcs to point 2 and beyond – 1
- Marking the pentagon along the circumference – 1
- Completing the pentagon – 1

(5 marks)

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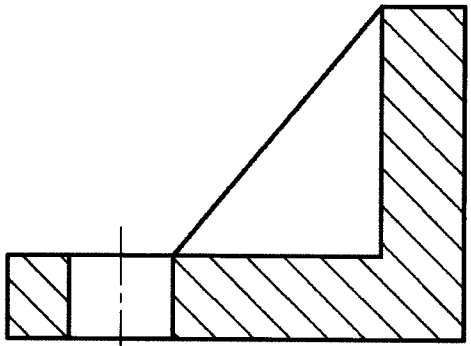
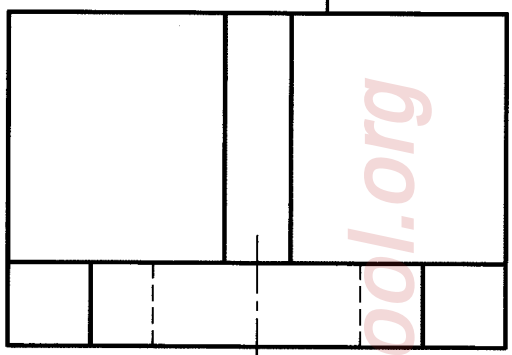
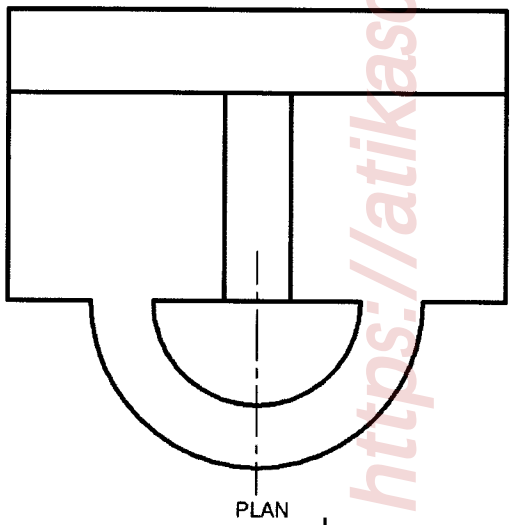
11.

SECTION B







Scale	- 1
1st angle projection	- 2 marks
F.E.	
Faces 4 x ½ = 1	- 2 marks
Centre line	- ½ mark
Hidden detail	- 1 mark
Web	- 1 mark
S.E.E.	
L – sectioned	- 1 mark
Web	- 1 mark
Labelling	- 1 mark
PLAN	
Faces 4 x ½	= 2 marks
Centre line	- ½ mark
Web	- 1 mark
Line work	- 1 mark
	15 marks
Total	**15 marks**

12 (a) **Types of second fixings:**

- Wall skirting
- Dado rails
- Picture rails
- Cornice

4 x ½ = (2 marks)

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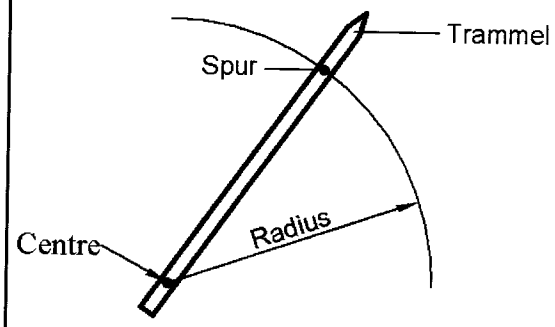
(b) **Classes of paints**

- **Oil based paints:**
  Provides a good hard gloss finish which is resistant to water and easy to clean.
- **Water based paints:**
  They make use of water as the thinning agent.
  They are detained by adding water to medium additives.
- **Emulsion paints:**
  They are easily applied and are dry faster.
  They can be obtained with a marshal finish.

3 x 1 = (3 marks)

(c) **Marking out a semi-circular bay window.**

- Begin by establishing the radius of the bay window. Mark the centre of the semi-circle and fix a trammel longer than the radius at the marked centre. On the trammel, fix a metal spur at the distance equal to the radius of the semi-circle. By rotating the trammel with the spur on the ground the outline of the bay window will be marked on the ground.



Sketch = 3

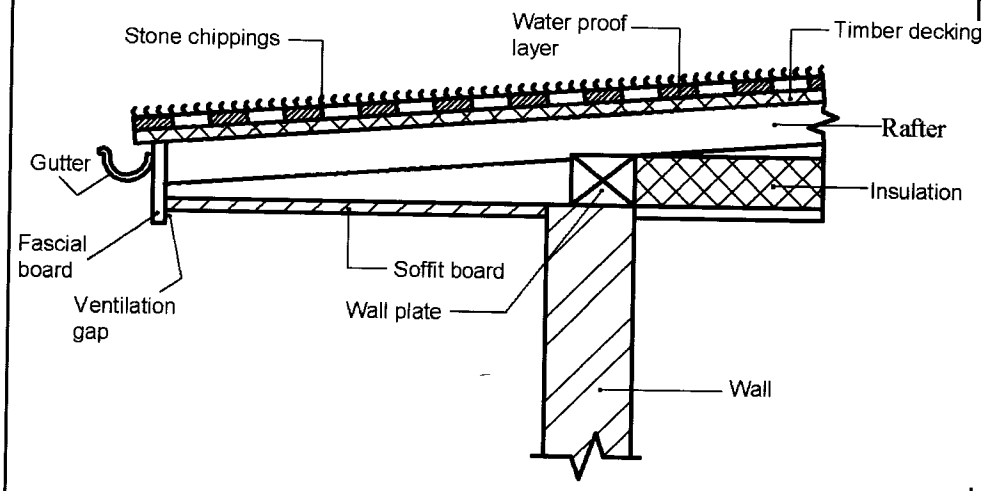
Labels

Any 4 x ½ = 2

Expl. = 5

(10 marks)

13. (a) **Detail of a timber flat roof at the eave.**



Sketch – 4 marks

Any (4 x ½) labels – 2 marks

(6 marks)

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(b)	**Procedure of setting out a rectangular building using a builder's square.** - Establish a baseline and fix a corner peg. - Place the builders' square with the 4m side on the base line and establish a perpendicular line along the 3m side. - Measure the length of the building along the base line and fix the second corner peg. - Establish the width of the building on the 3m side length and fix the third corner peg. - Place the builder's square on the second peg and establish a perpendicular line along the 3m side. - Measure the width of the building along the perpendicular line and place the fourth corner peg. - Extend all lines beyond the four corner pegs and fix them in place using other pegs. - Check the accuracy of the rectangle and confirm using diagonals. - Fix the profile boards. **9 x 1 =**	**(9 marks)**
14. (a)	**Methods of compacting concrete.** (i) **Rodding:** This is the method used to compact wet concrete in narrow and difficult places. It uses a rod. (ii) **Vibrating:** This method is used to compact wet concrete placed in thick layers and over large surfaces. It uses a poker vibrator, which should be completely inserted into the concrete. **2 x 2 =**	**(4 marks)**
(b)	**Procedure of preparing a smooth floor slab surface to receive a floor screed.** - Hack the entire floor area. - Sweep off the surface with a broom. - Sprinkle water on the surface. - Sweep a second time after the surface has dried out. - Apply floor screed.	**(5 marks)**

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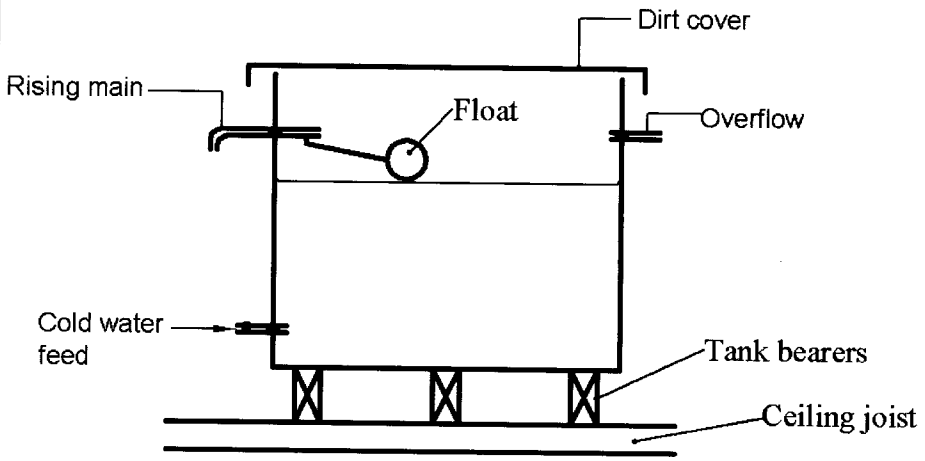
(c)	**Cross-section of a cold water storage tank.**  Sketch = 4 Labels Any 4 x ½ = 2 = 6 marks	**(6 marks)**
15. (a)	**Building code requirements for scaffolds.** - All putlogs and independent scaffolds should be tied securely to the building or structure at alternate heights vertically not more than 6m apart horizontally. - All working platforms above the ground level must be fitted with a toe board and guard rail. - Assembly of scaffolds with fittings should be carried out by trained and experienced personnel. - Store the components as close as practicable to the work area in order to minimize the distance over which loads are moved manually. - Use appropriate tools for the work preferred and avoid overtightening couplers. - All scaffolds should be tested for stability after adverse weather effects. **Any 4 x 1 =**	**(4 marks)**

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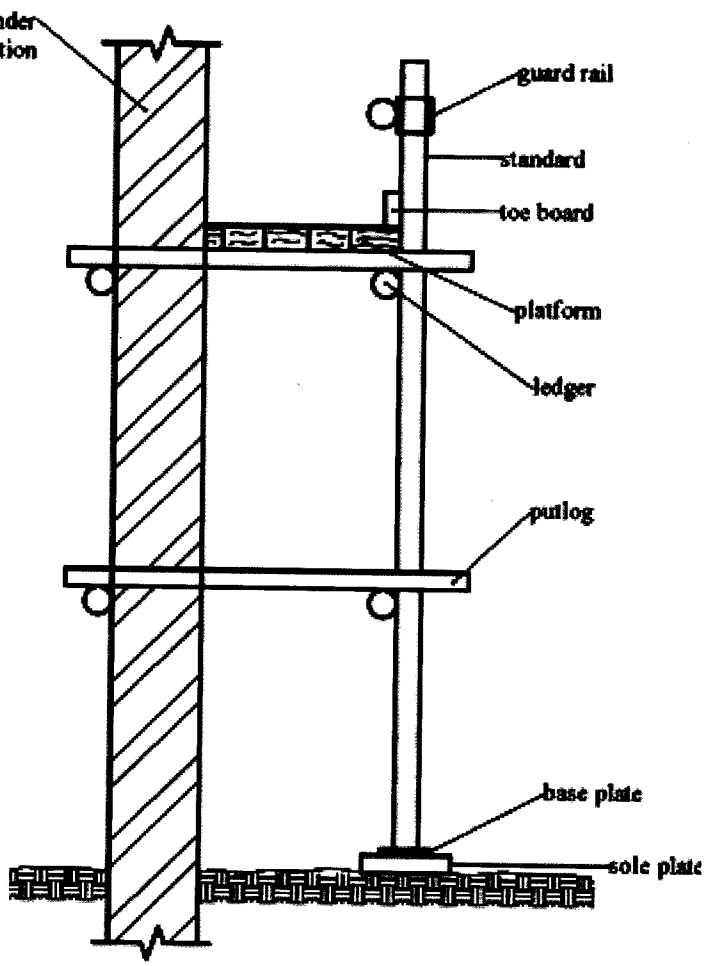
(b) (i)



Putlog Scaffold

Correct sketch = 2 marks
Any 6 labels @ ½ = 3 marks
5 marks

(5 marks)

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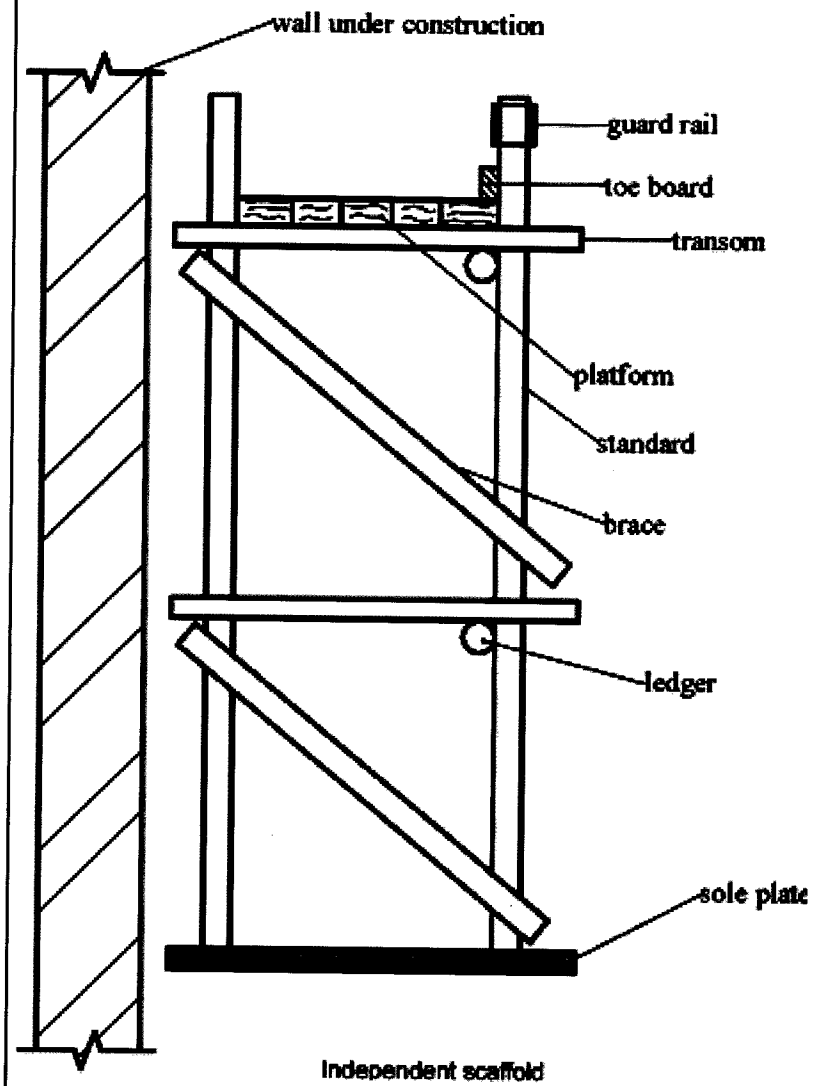
(b) (ii)



Independent scaffold

Correct sketch = 3 marks

Any 6 labels @ = 3 marks

6 marks

(6 marks)

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