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UNIT-I

BUILDING MATERIALS AND CONSTRUCTION

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CHAPTER 1

BRICKS

OBJECTIVE QUESTIONS

1. The process of mixing sand with the powdered natural soil to improve the quality is known as

(a) Moulding (b) Tempering

(c) Drying (d) Blending

2. Lime is mixed with brick earth

(a) To impart plasticity

(b) To increase durability

(c) To prevent shrinkage

(d) To increase impermeability

3. Maximum percentage of water absorption of II-class bricks in 24 hours should be limited to

(a) 10% (b) 15% (c) 20% (d) 22%

4. The over ground continuous kiln is

(a) Bull's trench kiln (b) Hoffman's kiln

(c) Tunnel kiln (d) All of these

5. Fire bricks should be laid in

(a) Lime mortar (b) Fire cement mortar

(c) Fire clay mortar (d) All of these

6. Bullnose bricks are not used in

(a) Walls (b) Rounding off sharp corners

(c) Arches (d) Pillars

[RPSC-AE – 2018]

7. If rain water falls on hot bricks, then shape of the bricks gets deformed, the defect is known as

(a) Efflorescence (b) Bloating

(c) Chuffs (d) Nodules

8. Hollow brick is

(a) Sound proof

(b) Heat proof

(c) About 1/3 in weight of standard brick

(d) All of the above

9. The compressive strength of burnt clay bricks as per IS 1077-1992 is

(a) 105 kg/cm^2 (b) 150 kg/cm^2

(c) 105–150 kg/cm^2 (d) 35–350 kg/cm^2

[Punjab - SSSB]

10. Consider the following statements:

A good soil for making bricks should contain

1. About 30% alumina.
2. About 10% lime nodules.
3. A small quantity of iron oxides, 5 to 6%.
4. About 5% magnesia.

Of these statements

(a) 1 and 2 are correct (b) 1 and 3 are correct

(c) 1, 3 and 4 are correct (d) 1 and 4 are correct

11. Consider the following statements:

For the manufacture of good quality bricks it is essential to

1. Use a reverberatory kiln.
2. Blend the soil with clay or sand as deemed appropriate.
3. Kneading the soil in a ghani.
4. Temper the soil in a pug mill.

Of these correct statements are

(a) 1 and 3 (b) 2 and 4

(c) 1, 3 and 4 (d) 2, 3 and 4

12. The raw bricks shrink during drying and warp during burning because of

(a) Less lime in brick earth

(b) Less silica and excess magnesia in brick earth

(c) Excess of alumina

(d) Alkalies in bricks earth

[UKESE – 2017]

13. In brick masonry the frog of the brick is generally kept on

(a) Top face (b) Bottom face

(c) Exposed face (d) Interior face

[JPSC-AE, Punjab JE - 2014, PHED-RAJ., Chandigarh JE - 2016]

14. The approximate weight of a brick should be

(a) 2.5 kg (b) 4.5 kg

(c) 5.1 kg (d) 3.2 kg

[Punjab JE - 2014, PEB.SUB ER. - 2017, DMRC - 2018]

15. Which one is the correct sequence of various operations of preparation of Brick-Earth.

I. Blending II. Digging
III. Weathering IV. Unsoiling
V. Tempering

(a) IV, II, III, V, I (b) IV, II, III, I, V
(c) II, IV, V, III, I (d) II, III, IV, V, I

[RPSC]

16. What is the nominal size of standard modular brick-tile?

(a) 19 cm × 9 cm × 4 cm
(b) 19 cm × 9 cm × 9 cm
(c) 20 cm × 10 cm × 10 cm
(d) 20 cm × 10 cm × 5 cm

[PEB-SUB ER. - 2017]

17. What is the unit weight of broken bricks ?

(a) 1520 kg/m^3 (b) 1630 kg/m^3
(c) 1800 kg/m^3 (d) 1420 kg/m^3

[PEB-SUB ER. - 2017]

18. The compressive strength of first class bricks should not be less than

(a) 7 N/mm^2 (b) 10.5 N/mm^2
(c) 12 N/mm^2 (d) 15 N/mm^2

[UJVNL – 2021, JPSC - AE]

19. The term 'frog' means :

(a) An apparatus to lift the brick
(b) Soaking brick in water
(c) A depression on the face of the brick
(d) Vertical joint in a brick work

[PEB-SUB ER. - 2017, LMRC JE, AEC-2017]

20. How many bricks will be required for 1 cubic meter of brick masonry?

(a) 100 (b) 500 (c) 250 (d) 400

[JPSC-AE, PEB-SUB ER. - 2017, Punjab JE – 2014, ISRO - 2013, MPSC - 2012]

21. Efflorescence is

(a) Formation of white patches on the surface of bricks due to the presence of insoluble salts in the clay used for making bricks
(b) Swelling of bricks due to the presence of carbonaceous matter and gas
(c) Deformation arising out of exposure to the weather
(d) Presence of impurities in the clay used for making bricks that show up after burning

[GESCOM-AE, PMB- JE - 2018]

22. Jhama bricks are

(a) Under burnt (b) Over burnt
(c) Not burnt (d) None of these

[KPSC-AE, KPSC-JE]

23. What is the content of clay and silt in good brick earth ?

(a) 20% (b) 30% (c) 40% (d) 50%

[KPSC-AE, JPSC-AE]

24. The presence of excess alumina in the clay is reflected in the bricks as

(a) Makes the bricks brittle and weak
(b) Makes the bricks crack and warp on drying
(c) Changes the colour of the brick from red to yellow
(d) Improves impermeability and durability of the brick

[KPSC-JE]

25. Water absorption for Ist class bricks should not be more than _____ .

(a) 12% (b) 15% (c) 20% (d) 25%

[KPSC-JE, JPSC-AE, ISRO - 2013]

26. Which of the following constituent in earth gives plasticity to mould bricks in suitable shape?

(a) Silica (b) Lime
(c) Alumina (d) Magnesia

[KPSC-JE]

27. Bricks are burnt at a temperature range of _____

(a) 500 – 700°C (b) 700 – 900°C
(c) 900 – 1200°C (d) 1200 – 1500°C

[KPSC-JE]

28. The standard size of modular brick including mortar thickness is

(a) 23 cm × 12 cm × 8 cm
(b) 19 cm × 20 cm × 19 cm
(c) 20 cm × 10 cm × 10 cm
(d) 18 cm × 9 cm × 9 cm

[KPSC-JE]

29. A good brick earth should, in general, contain

(a) About 20% to 30% of alumina
(b) About 50% to 60% of silica
(c) Not more than 5% of lime
(d) All of the above

[KPSC-JE]

30. In which of the following areas would refractory bricks be used?

(a) Retaining walls (b) Columns
(c) Piers (d) Combustion chambers

[KPSC-JE]

31. What is the standard size of masonry bricks ?
(a) 21 cm × 11 cm × 11 cm
(b) 20 cm × 10 cm × 10 cm
(c) 19 cm × 9 cm × 9 cm
(d) 18 cm × 8 cm × 8 cm
[KPSC-JE, JPSC-AE, TNPSC, Punjab-SSSB, MPSC - 2012, ISRO - 2013]

32. The main ingredient of a good quality brick earth is
(a) Magnesia (b) Lime
(c) Silica (d) Alumina
[KPSC-JE, RPSC]

33. Presence of which of the following is responsible for imparting yellow tint to bricks?
(a) Silica (b) Alumina
(c) Lime (d) Magnesia
[TSPSC-AE - 2015, DFCCIL - 2016]

34. The strength achieved by a brick depends on
(a) Composition of brick earth
(b) Nature of moulding adopted
(c) Burning and cooling process
(d) All of the above
[MPSC - 2012]

35. The red colour of bricks is due to :
(a) Iron oxide (b) Silica
(c) Magnesia (d) Alumina
[NBCC - 2017]

36. The recommended compression strength of A class Brick as per BIS is :
(a) 25 N/mm^2 (b) 20 N/mm^2
(c) 14 N/mm^2 (d) None of these
[NBCC - 2017]

37. Excess of silica in brick earth causes
(a) Loss of cohesion
(b) Impermeability
(c) Cracking and warping on drying
(d) None of the above
[Chandigarh JE - 2016]

38. A pug mill is used for
(a) Moulding of brick earth
(b) Baking of bricks
(c) Tempering of brick earth
(d) Testing of bricks
[ISRO - 2018]

39. Which tool is used for cutting bricks accurately?
(a) Bolster (b) Trowel
(c) Brick Hammer (d) Rammer
[Haryana JE - 2018]

40. Fire bricks are made from
(a) Fire clay (b) Quick lime
(c) Hydrate lime (d) Cement

41. Which one of following is not a defect in bricks?
(a) Wedge cut (b) Under burning
(c) Over burning (d) Black core
[DMRC - 2018]

42. In the manufacturing process of bricks, which moulding is not practiced?
(a) Ground moulding (b) Table moulding
(c) Automatic moulding (d) Machine moulding
[DMRC - 2018]

43. A frog in a brick is provided to mainly serve which of the following purposes?
(a) Emboss builder's name
(b) Reduce the weight of brick
(c) Improve insulation by providing hollows
(d) Form keyed joint between brick and mortar
[JPSC-AE, PPSC – 2021, Punjab-SDO – 2021, AEC - 2017]

44. The average compressive strength of 2nd class bricks should not be less than
(a) 75 kg/cm^2 (b) 12 kg/cm^2
(c) 10 kg/cm^2 (d) 15 kg/cm^2
[AEC - 2017]

45. The following soil is good for making bricks
(a) Black cotton (b) Silty
(c) Alluvial (d) Sand and silt
[RPSC ACF - 2011]

46. The percentage of perforation in solid bricks is about
(a) 5 (b) 10 (c) 15 (d) 20
[RPSC ACF - 2011]

47. The tolerance in the width of the mould of a class I brick is about
(a) ± 3 mm (b) ± 6mm
(c) ± 10 mm (d) ± 12 mm
[RPSC ACF - 2011]

48. The percentage of alumina in a good brick clay should be lies between
(a) 20% – 30% (b) 30% – 40%
(c) 40% – 50% (d) 50% – 60%
[DSSSB JE - 2015, Bihar JE - 2016]

49. If L is the length and B the width of the brick and t the thickness of mortar, the relation between these is
(a) L = 2B (b) L = B + t
(c) L = B + 2t (d) L = 2B + t

ANSWERS SHEET

1. ***Ans. (d)***

In the process of manufacturing bricks, the following four steps are involved:

1. Preparation of clay
2. Moulding
3. Drying
4. Burning

1. Preparation of clay :

(i) Unsoiling : In this process top layer of soil, about 200 mm in depth, is taken out and thrown away. The top soil is full of impurities and not use for purpose of preparing bricks.

(ii) Digging : The clay is then dug out from the ground. It is spread on the levelled ground.

(iii) Cleaning : The clay, as obtained in the process of digging, should be cleaned of stones, pebbles, vegetable matter, etc.

If these particles are in excess, the clay is to be washed and screened.

(iv) Weathering : The clay is then exposed to atmosphere for softening. The period of softening is from few week to few month.

(v) Blending : The required ingredient to be added to it and mixing the clay.

- Blending makes clay fit for next stage tempering.

(vi) Tempering : In the process of tempering, the clay is brought to a proper degree of hardness and it is made fit for the next operation of moulding.

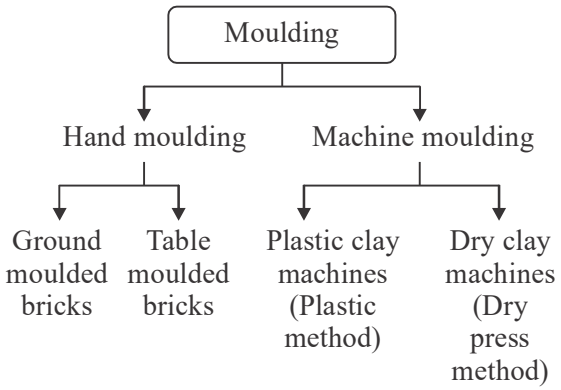
The water in required quantity is added to clay.

For manufacturing good bricks on a large scale, the tempering is usually done in pug mill. Which may be operated mechanically or with the help of animal.

2. Moulding :

The process of giving desire shape to the clay is term as moulding.

The moulding is done with the help of mould, which may be wood or steel.



3. Drying :

If bricks are directly burn without drying it lead to cracking and distortion.

4. Burning :

Burning imparts hardness and strength to the bricks and makes them dense and durable.

The bricks are burn at 1100°C temperature so that the ingredient of brick can fuse with each other and can provide desire strength and density to the bricks.

The burning of the bricks is done either in clamp and kiln.

The burning of clay may be divided into three main stages.

(i) Dehydration (400 – 650°C)

This is also known as water smoking stage.

(ii) Oxidation Period (650 – 900°C)

At this stage chemical changes occurs in the constituents of bricks.

(iii) Vitrification :

The temperature ranges 900 – 1100°C for low melting clay and 1000 – 1250°C for high melting clay.

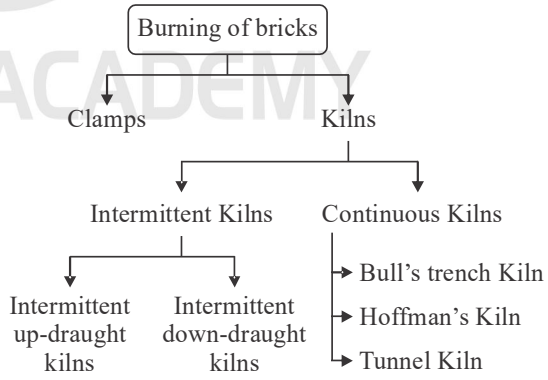
2. ***Ans. (c)***

3. ***Ans. (d)***

When bricks immersed in water for 24 hrs. it should not show absorption greater than 20% of its dry weight for first class brick and 22% for 2nd class bricks.

4. ***Ans. (b)***

The Hoffman's kiln is constructed overground and hence it is sometimes known as the flame kiln. Its shape is circular in plan and it is divided into a number of chambers.



5. ***Ans. (c)***

Fire clay bricks are made from fire clay and also known as refractory bricks.

These bricks are laid in fire clay mortar.

6. ***Ans. (d)***

Bullnose bricks : A brick moulded with a rounded angle is known as a bullnose. These types of bricks are used for rounded quoin (round corner). An external corner of a wall is known as quoin.

Bullnose bricks commonly used in the rounded edge for staircase steps, building corners, verandahs etc.

7. ***Ans. (c)***

Bloating : This defect observed as spongy swollen mass over the surface of burned bricks is caused due to the presence of excess carbonaceous matter and sulphur in brick clay.

Cracks : This defect may be because of lumps of lime or excess of water. When bricks come in contact with water, the absorbed water reacts with lime nodules causing expansion and a consequent disintegration of bricks.

Chuffs : The deformation of the shape of bricks caused by the rain water falling on hot bricks is known as chuffs.

Laminations : These are caused by the entrapped air in the voids of clay. Laminations produce thin lamina on the brick faces which weather out on exposure.

Black Core : When brick-clay contains bituminous matter or carbon and they are not completely removed by oxidation, the brick results in black core mainly because of improper burning.

Efflorescence : This defect is caused because of alkalis present in bricks. When bricks come in contact with moisture, water is absorbed by them.

This absorbed water dries out by evaporation from the exposed faces and the soluble salts it contains crystallize out on the surface.

On drying grey or white powder patches appear on the brick surface.

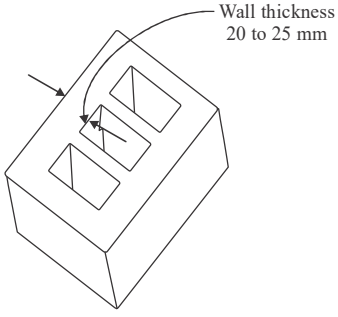
- Efflorescence can be minimized by selecting proper clay materials for brick manufacturing, preventing moisture to come in contact with the masonry. This can be achieved by providing waterproof coping and by using water repellent materials in mortars and by providing damp proof course.

8. ***Ans. (d)***

Hollow bricks are also known as the cellular or cavity bricks.

They are light in weight about one-third the weight of the ordinary brick of the same size.

Hollow bricks reduce the transmission of heat, sound and damp.



Hollow brick

9. ***Ans. (d)***

Class Designation	Average Compressive Strength not less than	
	N/mm^2	Kg/cm^2
35	35.0	350
30	30.0	300
25	25.0	250
20	20.0	200
17.5	17.5	175
15	15.0	150
12.5	12.5	125
10	10.0	100
7.5	7.5	75
5	5.0	50
3.5	3.5	35

10. ***Ans. (b)***

11. ***Ans. (b)***

12. ***Ans. (c)***

13. ***Ans. (a)***

The size of frog should be 10 cm × 4 cm × 1 cm.

The main purpose of providing frog is to form a key for holding the mortar and therefore, the bricks are laid with frogs on top.

It is also use to indicate the trade name of manufacturer's.

14. ***Ans. (d)***

15. ***Ans. (b)***

1. Unsoiling
2. Digging
3. Weathering
4. Blending
5. Tempering

16. ***Ans. (d)***

17. ***Ans. (d)***

18. ***Ans. (b)***

Type of bricks		**Compressive Strength (N/mm^2)**
First class bricks	-	10.5
Second class bricks	-	7.0
Common building bricks	-	3.5

19. ***Ans. (c)***

The depression provided in the face of a brick during its manufacturing is called frog in bricks.

20. ***Ans. (b)***

Size of standard brick should be 19 × 9 × 9 cm.

Size of standard brick with mortar 20 × 10 × 10 cm.

Volume of one brick $\Rightarrow 20 \times 10 \times 10 = 2000\ cm^3$

$= 2000 \times 10^{-6}\ m^3$

Number of bricks required in one cubic meter

$$\Rightarrow \frac{\text{Total Volume}}{\text{Volume of one brick}} = \frac{1}{2000 \times 10^{-6}}$$

$$\Rightarrow \frac{1000000}{2000} = 500 \text{ bricks}$$

$\Rightarrow$ Weight of 1 m^3 bricks approximately = 1800 kg.

21. ***Ans. (a)***

According to IS : 3495 – Part (3)

The liability to efflorescence shall be reported as nil, slight, moderate, heavy and serious.

- **Nil :** When the deposit of efflorescence is imperceptible.
- **Slight :** When not more than 10 percent of the exposed area of the brick is covered with a thin deposit of salts.
- **Moderate :** When the deposit of efflorescence is more than 10 percent but less than 50% of the exposed area of the brick but unaccompanied by powdering of flaking of the surface.
- **Heavy :** When the deposit of efflorescence is more than 50% but the deposits do not powder of flake away the brick surface.
- **Serious :** When there is a heavy deposit of salts accompained by powdering and/or flaking of the exposed surfaces.

22. ***Ans. (b)***

Under burnt bricks : These are half burnt bricks. The color is yellow. The strength is low. Such bricks should not be exposed to rain water. These are used as soiling under RCC footing or basement. These are also used as surkhi in lime terracing.

Jhumb bricks : Jhumb bricks are mostly not used because these are over burnt bricks with irregular shape and size. Jhumb bricks twisted due to over burning.

Modular bricks : Modular bricks of standard size 190 mm × 90 mm × 90 mm are used for high class brick masonry.

23. ***Ans. (d)***

A good brick earth should contain about 50% to 60% of silica. The excess of silica destroys the cohesion between particles and brick become brittle and weak.

24. ***Ans. (b)***

If Alumina is present in excess, the raw bricks shrink and warp during drying and burning and become too hard when burnt.

- The excess of silica destroys the cohesion between particles and bricks become brittle.
- The excess of lime causes the brick to melt and hence its shape is lost.
- The excess oxide of iron makes the bricks dark blue or blackish.
- Excess of magnesia leads to the decay of bricks.

25. ***Ans. (c)***

For first class bricks :

- These should have uniform texture.
- No impression should be left on the brick when a scratch is made by a finger nail.
- These should be free from flaws, cracks and stones.
- A metallic or ringing sound should come when two bricks are struck against each other.
- The surface should be smooth and rectangular, with parallel, sharp and straight edges and square corners.
- The crushing strength of the brick should not be less than 10 N/mm^2.
- Water absorption should not be greater than 20% of its dry weight.

26. ***Ans. (c)***

27. ***Ans. (c)***

28. ***Ans. (c)***

29. ***Ans. (d)***

30. ***Ans. (d)***

31. ***Ans. (c)***

- Standard size of modular brick as per Indian standard is 19 × 9 × 9 cm or 190 mm × 90 mm × 90 mm.
- Nominal size of modular brick is 20 × 10 × 10 cm (size with mortar) or 200 mm × 100 mm × 100 mm.

32. ***Ans. (c)***

Silica = 50 – 60%,

Lime = 4 – 5 %

Alumina = 20 – 30% ,

Iron oxide = 5 – 6%

Magnesia = 1%

33. ***Ans. (d)***

34. ***Ans. (d)***

35. ***Ans. (a)***

36. ***Ans. (c)***

The bricks with crushing strength of 7 to 14 N/mm^2 are graded A and those having above 14 N/mm^2 are graded as AA.

138. ***Ans. (b)***

Value of bulk density for bricks that was made with clay is **1500 kg/m3 to 2000kg/m^3**

139. ***Ans. (b)***

Hollow Bricks are used in **partition walls, boundary fences, huge structures,** etc. It is also likely to be used in areas prone to pollution for construction, in the masonry walls to be reinforced, and to reduce the use of mortar

140. ***Ans. (c)***

Water absorption should be 20% of its dry weight when immersed in cold water for 24 hours. The crushing strength of the brick should not be less than 10 N/mm^2

141. ***Ans. (d)***

When brickwork is set with a fine joint, it is usual to fill the interior joints with a thin liquid mortar. This process is called grouting

142. ***Ans. (d)***

143. ***Ans. (a)***

Water absorption test	After immersion in cold water for 24 hours, **water absorption shall not be more than 20 percent by dry weight,** for a good quality brick

Important point : Water absorption (per cent by mass) of brick after 24 hr immersion in cold water is given by

$$= \frac{(M_2 - M_1)}{M_1} \times 100$$

Where,

M_1 = Weight of oven-dried brick.

M_2 = Weight of brick after immersing in water for 24 hrs.

144. ***Ans. (d)***

The strength of bricks depends on **the soil used to make the bricks, method and making process, burning of bricks.** Since the nature of the soil varies from region to region, the average strength of bricks also varies from region to region. 3. Size and shape of the masonry construction.

145. ***Ans. (c)***

Frog is an indentation of depression on the top face of a brick made with the object of forming a key for the mortars. This reduces the weight of the brick also.

It is kept on the **top face** while constructing a wall so that mortar is filled properly in it.

Size of frog = 100mm × 40mm × 10mm

Depth of frog = 10mm to 20 mm

Purpose of frog : It will provide a key for holding mortar in brick masonry

It can be used for branding purpose

146. ***Ans. (b)***

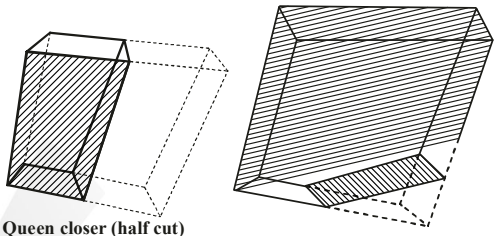
Blending : Process in which different ingredients of brick-earth are sprayed over the weathered clay in required proportions.

Wheathering : In which cleaned clay is exposed to the atmosphere for few weeks to few months.

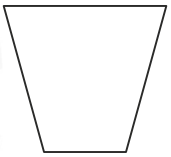
Pugging : Process of grinding clay with water so it enhance plasticity generally carried out in pug mill.

Tempering : Mixed ingredients is tempered by being thoroughly broken up of brick earth.

147. ***Ans. (a)***



Queen closer (half cut) (King closer side cut)



(Voussoir)

One side width more than other.

148. ***Ans. (a)***

149. ***Ans. (a)***

150. ***Ans. (c)***

151. ***Ans. (c)***

The internal size of mould is kept greater than the size of fully burned brick desirable to allow shrinkage during drying and burning.

152. ***Ans. (b)***

153. ***Ans. (d)***

154. ***Ans. (a)***

155. ***Ans. (c)***

156. ***Ans. (b)***

157. ***Ans. (c)***

❑❑❑

Bricks
SCAN ME

CHAPTER 2

STONES

OBJECTIVE QUESTIONS

1. Lime stone is a
(a) Igneous rock (b) Sedimentary rock
(c) Metamorphic rock (d) Granite rock
[KPSC-JE]

2. Marble contains mostly
(a) Lime (b) Silica
(c) Lime and silica (d) None of these

3. Which of the following is a mineral ?
(a) Basalt (b) Laterite (c) Granite (d) Calcite

4. Gravel is a type of
(a) Igneous rock (b) Sedimentary rock
(c) Metamorphic rock (d) None of the above

5. Rocks having silica as main constituent are called
(a) Calcareous rocks (b) Argillaceous rocks
(c) Silicious rocks (d) None of these

6. The tendency of minerals to split along a certain plane, is known as
(a) Fracture (b) Cleavage
(c) Breaking (d) Fault
[RPSC - AE – 2018, ISRO - 2017, PUDA – 2013, RPSC-ACF - 2011]

7. A stone is rejected if the water absorption is more than
(a) 10% (b) 20% (c) 25% (d) 30%
[UJVNL – 2021]

8. In stone masonry, the direction of pressure line is
(a) Parallel to natural bed
(b) Perpendicular to natural bed
(c) Inclined to natural bed at 30°
(d) Inclined to natural bed at 45°
[RPSC-AE – 2013]

9. For stones Moh's scale is used to determine
(a) Toughness (b) Hardness
(c) Flakiness index (d) Durability
[DFCCIL – 2018]

10. Which one of the following pairs is correctly matched?
(a) Sandstone - Igneous rock
(b) Lime stone - Sedimentary rock
(c) Basalt - Metamorphic rock
(d) Granite - Argillaceous rock
[PUNJAB – JE]

11. Stone generally used for railway ballast is
(a) Sand stone (b) Dolomite
(c) Marble (d) Basalt or Trap basalt

12. Specific gravity for most of the building stone lies between
(a) 1.5 to 2.0 (b) 2.0 to 2.5
(c) 2.5 to 3.0 (d) 3.0 to 3.5

13. The constituent responsible for strength in granite is
(a) Mica (b) Feldspar
(c) Quartz (d) All of these

14. Spalling hammer is used for
(a) Rough dressing of stones
(b) Quarrying of stones
(c) Carrying of stones
(d) All of the above

15. The tool used for blasting process in quarrying of stones is
(a) Dipper (b) Priming needle
(c) Jumper (d) All of these

16. Marble is a
(a) Igneous Rock (b) Sedimentary Rock
(c) Granite Rock (d) Metamorphic Rock
[RPSC - AE – 2016, KPSC- JE, RPSC-ACF - 2011]

17. Based on the following rocks and minerals select the correct statement.
Quartz, shale, basalt, granite, marble, gypsum, mica
(a) Basalt and marble are the only metamorphic rocks
(b) There is no sedimentary rock
(c) Granite is the only igneous rock
(d) Quartz and mica are minerals
[LMRC-JE]

18. Granite is not suitable for ordinary buildings purpose because
(a) It cannot be polished
(b) It is not a fire proof material
(c) It is costly
(d) It has less crushing strength
[LMRC-JE]

19. The stone that exhibits highest compressive strength is
(a) Slate (b) Gneiss
(c) Granite (d) Limestone
[LMRC-JE]

20. The best types of ballast is:
(a) Granite (b) Sand Stone
(c) Lime Stone (d) None of these
[Jharkhand SSC JE - 2016]

21. For a good building stone, its specific gravity should be greater than
(a) 1.5 (b) 1.7 (c) 2.2 (d) 2.7
[LMRC-JE]

22. Granite and basalt are examples of which of the following?
(a) Sedimentary rocks (b) Stratified rocks
(c) Igneous rocks (d) Metamorphic rocks
[NWDA-JE – 2021, PEB-SUB ER. - 2017]

23. Which of the following property of rock defines its capacity to store maximum amount of water?
(a) Texture (b) Hardness
(c) Porosity (d) None of these
[PEB-SUB ER. - 2017]

24. Chemically, marble is known as
(a) Metamorphic rock (b) Argillaceous rock
(c) Calcareous rock (d) Siliceous rock

25. The crystallization test is performed on stones to find out its ___.
(a) Durability (b) Fire resistance
(c) Hardness (d) Specific gravity
[PEB-SUB ER. - 2017]

26. Which of the following is a sedimentary rock?
(a) Sand stone (b) Limestone
(c) Coal (d) All of these
[GESCOM-AE]

27. Chemically, how would kaolin be classified as?
(a) Metamorphic rock (b) Calcareous rock
(c) Silicious rock (d) Argillaceous rock
[GESCOM-AE]

28. Rocks in which argil or clay predominates, are called
(a) Argillaceous rocks (b) Igneous rocks
(c) Calcareous rocks (d) None of these
[KPSC-AE]

29. Which of the following is a plutonic rock?
(a) Granite (b) Dolerite
(c) Basalt (d) None of these
[KPSC-AE]

30. Stones used for ornamental work should be
(a) Soft (b) Hard (c) Light (d) Heavy
[KPSC-AE, RPSC-ACF - 2011]

31. In stone masonry, let the stones be so placed that their layers are parallel to the direction of load. Then
(a) The stones split easily
(b) The stones are affected by moisture
(c) Both 'a' and 'b'
(d) Neither 'a' nor 'b'
[KPSC-AE]

32. Crushing strength of a good building stone should be more than _____ .
(a) 50 MPa (b) 100 MPa
(c) 150 MPa (d) 200 MPa
[SJVN – 2021, RSMSSB-JE – 2020, KPSC-JE, RPSC-ACF - 2011]

33. The process of taking out stones of various sizes from natural rocks is known as
(a) Dressing (b) Seasoning
(c) Quarrying (d) None of these
[KPSC-JE]

34. The process of giving definite and regular shape to quarried stone is called
(a) Pitching (b) Dressing
(c) Seasoning (d) Quarrying
[KPSC-JE]

35. The rocks formed due to cooling of magma at a considerable depth from earth's surface are called
(a) Plutonic rocks (b) Hypabyssal rocks
(c) Volcanic rocks (d) Igneous rocks
[KPSC-JE]

36. What type of a rock is sand stone ?
(a) Sedimentary rock (b) Metamorphic rock
(c) Igneous rock (d) Volcanic rock
[KPSC-JE]

37. Which of the following types of rocks is generally, used for roofing?
(a) Granite (b) Basalt
(c) Slate (d) Pumice
[TNPSC, KPSC-JE, MPSC - 2012]

38. What is a Shingle ?

(a) Decomposed laterite (b) Crushed granite

(c) Water bound pebbles (d) Air weathered rock

[KPSC-JE]

39. Which of the following rocks is not calcareous?

(a) Lime stone (b) Laterite

(c) Chalk (d) Both 'a' and 'c'

[KPSC-JE]

40. Marble is quarried by

(a) Heating (b) Excavating

(c) Wedging (d) Blasting

41. Which is the most dangerous for decaying the stone?

(a) Efflorescence (b) Water absorption

(c) Improper bedding (d) Vegetation growth

42. Smith's test is conducted on a sample of stone to find out which of the following parameter?

(a) Compressive strength

(b) Toughness

(c) Presence of soluble matter

(d) Hardness

[TSPSC-AE - 2015]

43. The hardest mineral is

(a) Marble (b) Diamond

(c) Talc (d) Quartz

[TNPSC, MPSC - 2012]

44. Match List-I with List-II correctly and select your answer using the codes given below :

List-I (Stone test)	**List-II (Characteristics)**
A. Acid test	1. Compressive strength
B. Attrition test	2. Weathering quality
C. Crushing test	3. Toughness
D. Impact test	4. Rate of wear

Codes :

	A	**B**	**C**	**D**		**A**	**B**	**C**	**D**
(a)	1	2	3	4	(b)	3	1	4	2
(c)	2	4	1	3	(d)	4	3	2	1

[TNPSC, MPSC - 2012]

45. Granite mainly composed of quartz and feldspar particles, is obtained from

(a) Sedimentary rocks (b) Metamorphic rocks

(c) Igneous rocks (d) Volcanic rocks

[ISRO - 2015]

46. The dressing of stone is done

(a) Immediately after quarrying

(b) After seasoning

(c) After three months of quarrying

(d) Just before construction

[NBCC - 2017, TSPSC-AE - 2015]

47. The compressive strength of stone is find out by

(a) Attrition test (b) Crushing test

(c) Hardness test (d) Impact test

[NBCC - 2017]

48. The rocks having alumina or clay as their significant components are known as

(a) Siliceous rocks (b) Argillaceous rocks

(c) Calcareous rocks (d) None of these

[ISRO - 2018]

49. The rock contains several minerals is known as

(a) Polymer rock (b) Polymineralic rock

(c) Monomineralic rock (d) Homomineralic rock

[Haryana JE - 2018]

50. Which one of the following test is used to determine the rate of wear of stones?

(a) Crushing test (b) Hardness test

(c) Attrition test (d) Impact test

[PMB JE - 2018]

51. Gneiss is chemically classified as a/ an :

(a) Aqueous rock (b) Sedimentary rock

(c) Metamorphic rock (d) Siliceous rock

[DMRC - 2018]

52. The natural moisture contained in a newly quarried/freshly cut stone is known as :

(a) Quarry sap (b) Wetting

(c) Water content (d) Natural spring

[DMRC - 2018]

53. The rock formed due to solidification of molten mass laying below or above the earth surface is called a/an:

(a) Argillaceous rock (b) Siliceous rock

(c) Igneous rock (d) Calcareous rock

[DMRC - 2018]

54. Which of the following is NOT a tool for dressing stones?

(a) Face hammer (b) Mallet

(c) Point chisel (d) None of these

[DMRC - 2018]

55. According to Mohs scale of hardness, the mineral with the least hardness is :

(a) Gypsum (b) Sandstone

(c) Calcite (d) Talc

[DMRC - 2018]

115. Gypsum is a:
(a) Mechanically formed sedimentary rock
(b) Igneous rock
(c) Chemically precipitated sedimentary rock
(d) Metamorphic rock
[RRB JE - 2014]

116. Syenite is a
(a) Acid rock
(b) Hypabyssal rock
(c) Basic rock
(d) Deep seated plutonic rock
[Jharkhand SSC JE - 2016]

117. Crushing strength of a good building stone should be more than
(a) 150 MPa (b) 200 MPa
(c) 50 MPa (d) 100 MPa
[RSMSSB-JE-2020]

118. The rocks formed from molten magma, are called:
(a) Sedimentary rocks (b) Igneous rocks
(c) Metamorphic rocks (d) None of these
[Cochin Shipyard]

119. The rocks formed by gradual deposition, are called:
(a) Sedimentary rocks (b) Igneous rocks
(c) Metamorphic rocks (d) None of these
[Cochin Shipyard]

120. Rocks formed due to alternation of original structure due to heat and excessive pressure are called :
(a) Sedimentary rocks (b) Igneous rocks
(c) Metamorphic rocks (d) None of these
[Cochin Shipyard]

121. Geologically, marble is known as :
(a) Sedimentary rock (b) Igneous rock
(c) Metamorphic rock (d) Staratified rock
[Cochin Shipyard]

122. Gniess is obtained from :
(a) Igneous rocks
(b) Metamorphic rocks
(c) Sedimentary rocks
(d) Sedimentary-metamorphic rocks
[Cochin Shipyard]

123. Good quality stones must :
(a) Be durable (b) Be free from clay
(c) Resist action of acids (d) All the above
[Cochin Shipyard]

124. Natural granite used for cladding in building belongs to the category of :
(a) Igneous Rock (b) Acid Rock
(c) Sedimentary (d) Metamorphic Rock
[RPSC(ATP)-2018]

125. Magic rocks are a part of
(a) Igneous rocks (b) Sedimentary rocks
(c) Metamorphic rocks (d) Fossil rocks
[GPSC-2019]

126. The transparent crystal of quartz is known as:
(a) Hornstone (b) Anorite
(c) Pumice (d) Rock crystal

127. IS 4101-1967-Part 1 covers the specifications for_____.
(a) Stone facing works (b) Pre stressed concrete
(c) Brickwork (d) Steel tubular scaffolding

128. Kaolin is chemically classified as _____.
(a) silicious rock (b) metamorphic rock
(c) calcareous rock (d) argillaceous rock

129. The rocks which are formed due to cooling of magma at a considerable depth from earth's surface are called _____.
(a) Plutonic rocks (b) Volcanic rocks
(c) Hypabyssal rocks (d) Metamorphic rocks

130. Which of the following is an example of a hypabyssal rock?
(a) Granite (b) Gabbro
(c) Syenite (d) Dolerite

131. What is the bulk density of granite?
(a) 1600 to 1800 kg/m^3 (b) 1450 to 1650 kg/m^3
(c) 2500 to 2700 kg/m^3 (d) 500 to 600 kg/m^3

132. Which is the hardest mineral among the following options?
(a) Feldspar (b) Quartz
(c) Amphibole (d) Garnet

133. Which is the unstratified stone among the following?
(a) Limestone (b) SandStone
(c) Granite (d) Shale

134. _____ rock is the result of solidification of molten magma within the Earth's crust.
(a) Sedimentary (b) Basalt and Trap
(c) Granite (d) Metamorphic

135. A size of the test specimen used in the crushing test to determine a compressive strength of stones is
(a) 50×50×50 (b) 100×100×100
(c) 75×75×75 (d) 40×40×40

136. Name the test to be conducted on limestone to determine the amount of calcium carbonate content ?
(a) Slacking test (b) Heat test
(c) Water test (d) Ball test

137. The process of converting a stone to a required shape and surface is known as
(a) Seasoning (b) Dressing
(c) Quarrying (d) Pitching

161. The principal chemical constituent present in an argillaceous rock is :

(a) SiO_2 (b) Lime

(c) Al_2O_3 (d) Dolomite

[DFCCIL 2018]

162. According to geological classification, rocks are divide into three different categories i.e.. Igneous rocks. Sedimentary rocks an metamorphic rocks. In which category Granite. Basalt and Dolerite etc. types of rocks fall ?

(a) Sedimentary rocks (b) Metamorphic rocks

(c) Igneous rocks (d) Stratified rocks

[DFCCIL 2016]

163. Which of the following types of chemical weathering is associated with the feldspar, which can be found in granite changing to clay ?

(a) Oxidation (b) Hydrolysis

(c) Hydrogenation (d) Carbonation

[DFCCIL 2016]

164. What is the minimum crushing strength of Granite used in India ?

(a) 200 N/mm^2 (b) 100 N/mm^2

(c) 50 N/mm^2 (d) 250 N/mm^2

[MPSC 2017]

165. Geologically the earliest rock in the earth is.

(a) Igneous (b) Sedimentary

(c) Metamorphic (d) None of the above

[UJVNL AE 2021]

166. Schist is a type of

(a) metamorphic rock (b) Sedimentary rock

(c) Igneous rock (d) Mineral

[UJVNL AE 2021]

167. The stone whose crushing strength is maximum, is :

(a) Granite (b) Chalk

(c) Slate (d) Marble

[UKPS JE 2015]

168. On metamorphosis lime stone becomes

(a) Slate (b) Quartzite

(c) Marble (d) Basalt

[Town Country Planner -2007, PWD -2006]

169. The stone extending throughout the thickness of wall acts as a bond stone

(a) Building stone (b) Corbet stone

(c) Drip stone (d) Through stone

[DMRC- 2007]

170. The preparation of surface of stone to obtain required size and shape is known as

(a) Quarrying of stone

(b) Blasting of stone

(c) Seasoning of stone

(d) Dressing of stone

[DRDO- 2007]

171. Quartzite and marble are by nature

(a) Volcanic (b) Plutonic

(c) Sedimentary (d) Metamorphic

[TNPSC-2014]

172. Marble is quarried by

(a) Heating (b) Excavating

(c) Wedging (d) Blasting

[TNPSC - 2014, TNPSC-2013]

173. The hardest rock is

(a) Marble (b) Diamond

(c) Talc (d) Quartz

[TNPSC-2010, 2007]

174. Match list - I correctly with List-II and select your answer

List -I (Rock)	**List-II (Type)**
(A) Basalt	1. Sedimontary
(B) Lignite	2. Igneous
(C) Lime stone	3. Calcareous
(D) Slate	4. Metamorphic

Codes :

	A	B	C	D
(a)	1	3	4	2
(b)	1	2	3	4
(c)	2	3	1	4
(d)	2	1	3	4

[TNPSC-2014]

175. Which of the following are known as silicious rock

(a) Slate (b) Limestone

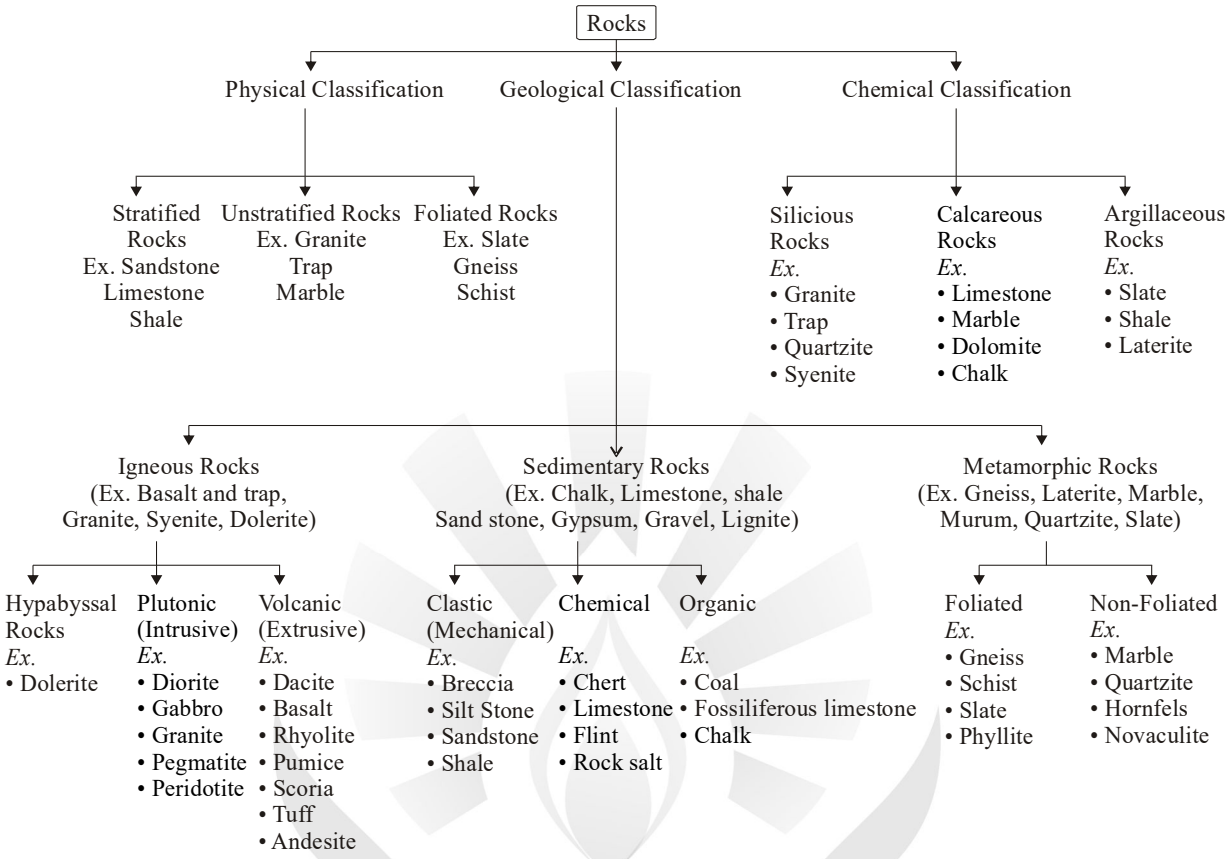
(c) Laterites (d) Granite

[DSSB JE 2015]

❑❑❑

ANSWERS SHEET

1. ***Ans. (b)***



2. ***Ans. (c)***

Marble is a metamorphic rock that form when limestone is subjected to heat and pressure.

In limestone, silica and lime both present.

3. ***Ans. (d)***

Minerals in the sedimentary rocks :

1. Calcite
2. Limonite
3. Magnesite

4. ***Ans. (b)***

5. ***Ans. (c)***

Chemical classification of rocks:

(a) Silicious Rocks : In these rocks, the silica is predominates.

(b) Argillaceous Rocks : In these rocks, the alumina or clay predominates.

(c) Calcareous Rocks : In these rocks, calcium carbonate predominates.

6. ***Ans. (b)***

7. ***Ans. (a)***

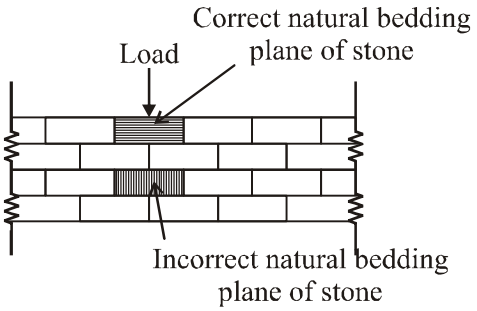
8. ***Ans. (b)***

Original bed of formation of the stone is called natural bed.

Stone should be placed such that the load line is at right angle to the natural bed.

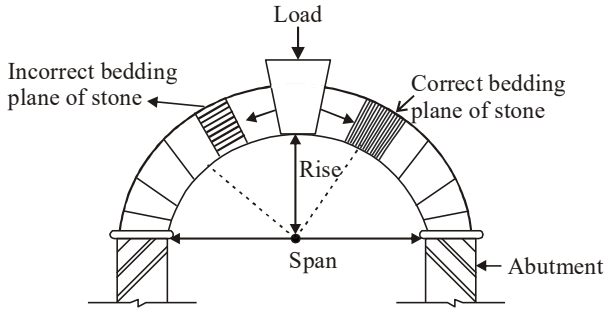
In arch and dome we use light weight stones.

For stone walls :



In stone walls the natural bedding plane is normal to the load.

For stone arches:



In arches the natural bedding plane should be radial.

9. ***Ans. (b)***

A Scale use to measure the relative hardness and resistance to scratching between minerals.

10. ***Ans. (b)***

11. ***Ans. (d)***

12. ***Ans. (c)***

13. ***Ans. (c)***

14. ***Ans. (a)***

Some stone dressing tools :

(a) Mash hammer

(b) Scabbling hammer

(c) Punch chisel

(d) Dressing knife

Note : A large hammer usually with a flat face and straight pin used for breaking and rough-dressing of stones.

15. ***Ans. (d)***

Some tools used for blasting :

1. Dipper
2. Jumper
3. Scraping spoon
4. Tamping bar
5. Priming needle

16. ***Ans. (d)***

Examples of metamorphic rocks include quartzite, marble, slate, gneiss etc.

17. ***Ans. (d)***

Quartz and Mica are minerals of igneous rock.

1. Gypsum and shale are sedimentary rocks
2. Marble – Metamorphic rock
3. Basalt and granite – Igneous rock

18. ***Ans. (c)***

19. ***Ans. (b)***

20. ***Ans. (a)***

21. ***Ans. (d)***

For good building stone, it's specific gravity should be greater than 2.7.

Good building stones should be homogeneous in structure.

Stones with homogeneous and crystalline texture are hard and compact.

Hence, the crushing strength of stone depends upon texture and specific gravity.

22. ***Ans. (c)***

23. ***Ans. (c)***

24. ***Ans. (c)***

25. ***Ans. (a)***

26. ***Ans. (d)***

27. ***Ans. (d)***

The primary constituent in kaolin is the mineral kaolinite.

Kaolinite is a clay mineral.

28. ***Ans. (a)***

29. ***Ans. (a)***

30. ***Ans. (a)***

Soft stones used for ornamental work.

Heavy stones used for retaining walls.

Light stones used for Arches and domes.

31. ***Ans. (c)***

32. ***Ans. (b)***

For the good quality stone, the crushing strength should be greater than 100 N/mm^2.

The approximate values of crushing strength of some stones are given below:

Rock	Stone	Crushing strength in N/mm^2
Igneous	Basalt	150 to 185
	Granite	75 to 127
	Trap	330 to 380
Sedimentary	Laterite	1.80 to 3.10
	Limestone	54
	Sandstone	64
	Shale	0.20 to 0.60
Metamorphic	Gneiss	206 to 370
	Slate	75 to 207

33. ***Ans. (c)***

Quarrying : The process of taking out stones from natural rock beds is known as the quarrying.

Methods of Quarrying :

1. Quarrying with hand tools
   (a) Digging or excavating
   (b) Heating
   (c) Wedging
2. Quarrying with channelling machine
3. Quarrying by blasting.

Explosive used in blasting :

1. Blasting powder or gun powder
2. Dynamite
3. Cordite
4. Blasting cotton or gun cotton
5. Gelatine dynamite
6. Lithofractor
7. Rock-a-Rock
8. Liquid oxygen

34. ***Ans. (b)***

Quarrying : The process of taking out stones from natural rock beds is known as the quarrying.

In case of a quarry, the operations are carried out at ground level in an exposed condition.

Crushing : The process in which construction aggregate produced by mining a suitable rock deposit and breaking the removed rock down to the desired size using crushers.

The aggregate obtained from crushing are distinct from gravel which is produced by natural processes of weathering and erosion and has a more rounded shape.

Dressing : The dressing of stone is defined as "The process giving a proper size, shape and finish to the roughly broken stones as obtained from the quarry.

Dressing of stones is done immediately after quarring and before seasoning to achieve less weight for transportation.

Seasoning : The stones obtained from quarry contain moisture in the pores. The strength of the stone improves if the moisture is removed before using the stone. The process of removing moisture from pores is called seasoning.

The process takes about 6 to 12 months for complete seasoning.

35. ***Ans. (a)***

Geological classification of rocks :

1. **Igneous Rocks** : Rocks formed by cooling of magma are known as igneous rocks.
   (a) Plutonic Rocks : These rocks are formed due to cooling of magma at a considerable depth from earth's surface.
   (b) Hypabyssal Rocks : These rocks are formed due to cooling of magma at a shallow depth from the earth's surface.
   (c) Volcanic Rocks : These rocks are formed due to pouring of magma at earth's surface.
2. **Sedimentary rocks :** Formed by weathering deposits by wind, water, frost, sun etc.
3. **Metamorphic rocks :** Formed by gradual changes in the structures of either igneous or sedimentary rocks caused by heat, water, pressure etc.

Physical classification of Rocks :

1. **Stratified Rocks :** These rocks shows distinct layers along which the rocks can be split.
2. **Unstratified Rocks :** These rocks do not show any stratification and cannot be easily split into thin layers.
3. **Foliated Rocks :** These rocks have a tendency to be split up in a definite direction only.

36. ***Ans. (a)***

37. ***Ans. (c)***

38. ***Ans. (a)***

39. ***Ans. (b)***

40. ***Ans. (c)***

41. ***Ans. (c)***

Common stonework defects :

1. Salt Crystallisation
2. Frost Attack
3. Metal Expansion
4. Incorrect Mortar
5. Improper bedding

If the stone is face bedded (the layers are vertical), it is more vulnerable to damage through crystallisation of salts and / or frost action.

42. ***Ans. (c)***

132. *Ans. (d)*

- Felspar = 6
- Quartz = 7
- Amphibole = 5-6
- Garnet = 6.5 – 7.5

133. *Ans. (c)*

Example : Granite, marble, trap are few example of unstratified.

134. *Ans. (c)*

Sedimentary Rocks : Rocks formed by accumulation, compaction, and consolidation of sediments are sedimentary rocks. It is also known as secondary rocks.

Examples : Breccia, Limestone, Sandstone, Shale

Metamorphic Rocks : Rocks formed due to metamorphism (process responsible for all the changes that take place in an original rock under the pressure) are known as metamorphic rocks.

Examples: Quartzite, Marble, Slate, Phyllite, Schist, Gneiss

Igneous Rock: Rocks formed due to cooling or solidification of magma or lava is known as igneous rocks.

There are two types of igneous rocks:

Intrusive Igneous Rocks: These rocks are formed due to cooling/solidification of magma within the crust of a planet. It is also known as Plutonic Rock.

Examples: Dike, Sill, **Granite,** Loccolith, Pegmatite, etc.

Extrusive Igneous Rocks: These rocks are formed due to cooling/solidification of magma at the crust's surface. It cools faster than the intrusive one.

Examples: **Basalts, Traps,** Black Smokers, etc.

135. *Ans. (d)*

Crushing test :

- **To find the compressive strength of stone**
- It can be tested by the universal testing machine
- Size of sample 40 × 40 × 40 mm
- The specimen should be placed in water for 72 hours before testing
- It is defined as **the load per unit area at which a stone starts cracking**
- The **minimum value of crushing strength** of stone should not be less than **100 N/mm^2.**

Important points :

- An **attrition test** is used to find the rate of wear of stone
- The **hardness test** is used to find the hardness of stone **means** no mark of scratching on the stone
- An **impact test** is used to find toughness index of stone
- **The specific gravity** of stones is **2.4–2.8**

136. *Ans. (a)*

The **amount of Calcium Carbonate in limestone** is determined by **performing the acid test.** The acid used is **dilute Hydrochloric acid.** The reaction involved is :

$CaCO_3 + 2Hcl \rightarrow CaCl_2 + H_2O + CO_2$

The method used for measuring $CaCO_3$ comprises the following steps

1. Dissolving limestone in hydrochloric acid.
2. Adding KOH solution and Calcium Carboxylate indicator into said solution.
3. Titrating the solution until its color turns to blue from red using EDTA standard solution and then working out the $CaCO_3$ content on the basis of the titer of EDTA.

137. *Ans. (b)*

The process of giving a proper size, shape, and finish to the roughly broken stones as obtained from the quarry is known as **"Dressing of stone"** and is carried out for the following purposes: To get the desired appearance from stone work.

138. *Ans. (b)*

IS 1124: Method of test for determination of water absorption, apparent specific gravity and porosity of natural building stones

139. *Ans. (d)*

140. *Ans. (d)*

141. *Ans. (a)*

142. *Ans. (d)*

143. *Ans. (b)*

The hematite API specific gravity specification is **4.9**. Specific gravity is the key to mud weighting material performance.

144. *Ans. (a)*

145. *Ans. (b)*

Classification of Rocks :

- Metamorphic rocks have been formed by **modification of pre-existing rocks by heat, pressure,** and chemical processes, usually while buried deep below Earth's surface