

Name: .....

**Exam : Aerial binders and concrete**

**Choose the correct answer**

1- Gypsum is chemically defined as

- $\text{CaSO}_4 \cdot 1/2\text{H}_2\text{O}$
- $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$
- $\text{CaSO}_4$

2- One of the main causes of cement expansion is

- Excess gypsum
- Rapid cooling
- Low CaO content

3- The apparatus used to determine normal consistency of cement is

- Blaine apparatus
- Vicat apparatus
- Pycnometer

4- Aerial lime is mainly obtained from:

- Gypsum
- Limestone
- Clinker

5- To properly slake 100 g of quicklime, the required mass of water is approximately:

- 32 g
- 18 g
- 25 g

6- A mortar that is too compact and insufficiently porous

- Hardens faster
- Carbonates completely
- Never hardens completely

7- The setting of plaster is accompanied by

- A decrease in temperature
- A slight cooling
- A sharp rise in temperature

8- The typical composition of ordinary concrete is approximately

- 60 % cement, 20 % water, 20 % aggregates
- 40 % sand, 40 % cement, 20 % water
- 51 % aggregates, 34 % sand, 10 % cement, 5 % water

9- Open-cast extraction of gypsum has the disadvantage of

- Incomplete extraction
- Difficulty during bad weather
- Excessive hardness of gypsum

10- The main constituent of Portland clinker is

- Dicalcium silicate ( $\text{C}_2\text{S}$ )
- Tricalcium aluminate ( $\text{C}_3\text{A}$ )
- Tetracalcium aluminoferrite ( $\text{C}_4\text{AF}$ )
- Tricalcium silicate ( $\text{C}_3\text{S}$ )

11- The correct chemical reaction for limestone calcination is

- $\text{CaO} + \text{CO}_2 \rightarrow \text{CaCO}_3$
- $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$
- $\text{Ca}(\text{OH})_2 \rightarrow \text{CaO} + \text{H}_2\text{O}$

12- High-performance concrete (HPC) is characterized by

- A water-to-cement ratio (W/C) > 0.6
- A 28-day compressive strength < 30 MPa
- A 28-day compressive strength > 50 MPa

13- An essential property of lime mortars is

- High compressive strength
- High rigidity
- High elasticity
- Total air impermeability

14- One important fire protection property of plaster is due to

- Its high density
- Its dehydration during fire
- Its metallic content
- Its low porosity

15- Why is plaster not used as a load-bearing material?

- It is too expensive
- It has low compressive strength
- Humidity significantly reduces its strength
- It is difficult to mold

16- The main role of aggregates in concrete is to

- Accelerate the setting of cement
- Reduce cost and improve strength
- Increase the amount of water
- Replace cement

17- The strength of concrete is mainly defined by

- Its tensile strength
- Its flexural strength
- Its compressive strength
- Its ductility

18- The slaking of quicklime is a reaction that is

- Endothermic
- Neutral
- Slightly exothermic
- Strongly exothermic

19- Plaster contributes to fire protection because

- It ignites slowly
- It releases inert gases
- It absorbs heat during dehydration

20- An excess of water in concrete causes

- An increase in strength
- An increase in permeability
- Better durability