

CTEP – UNIT 1

PART A (2 MARKS)

1. Define cement.

Cement is a [binder](#), a substance that sets and hardens and can bind other materials together. It is a modern concrete that was made from crushed rock with burnt lime as binder.

2. What are the types of cements are now commonly available in India and used for reinforced concrete construction in India? (NOV/DEC 2010)

1. Ordinary Portland cement OPC
Grade 33- IS 269 – 1989
Grade 43- IS 8112- 1989
Grade 53- IS 12269- 1987
2. Portland pozzolana cement PPC
IS 1489 part I– 1991 fly ash based
IS 1489 part II – 1991 claimed clay – based

3. Write the constituents of OPC cement (or) Chemical composition of cement?

Various constituents of an ordinary Portland cement are

lime 62%	silica 22%,	alumina 5%,	calcium sulphate 4%,
iron oxide 37%,	magnesium oxide 2%,	sulphur trioxide 1%,	alkalis 1%.

4. What is grade of cement? List any three grades of cement with their compressive strength. (Nov 2010, 2011)?

Grade of a cement represents the specific 28 days compressive strength. The OPC has been classified into three grades, namely 33 grade, 43 grade and 53 grade based upon the strength of the cement.

If the 28 days strength is not less than 33 N/mm² it is called 33 grade cement. Accordingly, if the strength is not less than 43 N/mm² it is called 43 grade cement and if the strength is not less than 53 N/mm² it is called 53 grade cement.

5. List any four concrete chemicals with its applications? (Nov 2011) (or) Name some admixtures used in concrete?(Nov 2014)

Admixtures and construction chemicals are the chemicals added along with the ingredients of concrete or afterwards to get the required mix to fit in for the desired strength and durability.

Plasticizers - lignosulphonates

Retarders-Calcium sulphate

Accelerators-calcium chloride

Air-entraining Admixture- Natural wood resins, animal and vegetable fats

6. Write the properties of cement.

- * Best binding material
- * High plastic properties
- * High strength for masonry

* Short time hardening process

7. Define heat of hydration? (Nov 2010, May 2015) (or) Define Hydration of cement?(Nov 2015)

The reaction of cement with water is exothermic. The reaction liberates a considerable quantity of heat. This liberation of heat is called heat of hydration.

8. Define concrete.

Concrete is an important construction material consisting of ingredients which are inert material coarse aggregate, fine aggregate and binding materials cement or lime. It is a mixture of cement, fine aggregate, coarse aggregate and water.

9. List the types of concrete chemical and applications?(Apr/May 2010)

Construction chemical are the chemical added along with ingredients of concrete to get the raged mix to fit in for the desired strength & durability

Admixtures, plasticizers and super plasticizers, retarders, polymer bonding agents, water proofing chemical.

10. What is meant by proportioning of concrete?

Selection of proper quantity of cement, course aggregate sand and water obtain the desired quantity is known as proportioning of concrete.

11. What is meant by grade of concrete?

The grade denotes the 28 day cube strength in N/mm^2 the strength of concrete is determined by casting it in 15cm cube moulds curing it in prescribed condition and then testing it after 28 days.

12. Define mix design of concrete?

Mix design can be defined as the process of selecting suitable ingredients of concrete and determining their relative proportion with the object of producing concrete of creation minimum strength & durability as economically as possible.

13. Define water – cement ratio? State its importance? (Nov 2009)

Water – cement ratio as the ratio of the weight of mixing water to the weight of cement used in the concrete the strength of concrete can be increases with decreases of water – cement ratio.

The strength of concrete is only dependent upon water-cement ratio provided the mix is workable. When the water-cement ratio is below the practical limit, the strength of the concrete falls rapidly due to introduction of air voids. High Water – cement ratio is required when hand compacted and low Water – cement ratio, when vibrator is used.

14. What are the various stages of concrete production? (Apr/May 2011)

- Batching or measurement of materials
- Transporting
- Compacting
- Finishing
- Mixing
- Placing
- Curing

15. What is meant by segregation of concrete?

If the constituent material are not in proper proportions or they are not properly mixed then all the ingredient may not be distributed uniformly to make the mix a homogeneous mass this separation of materials is called segregation it can also happen if mixed concrete poured from a large height.

16. Define batching of materials? (Nov/Dec 2013)

After fixing the desired proportion, the quantity of required ingredients ,viz ,cement, Coarse aggregate, fine aggregate, have to be measured out in batches for mixing. This process of measuring out ingredients is called batching

There are two types of batching

- Weight batching
- Volume batching

17. What are the methods of compacting concrete? (May/June 2013)

- Vibration
- Manual techniques
- Poker Vibrators

18. What is curing of concrete and why it is necessary? (Nov 2012)(OR) What is the necessity for curing of concrete? (May 2014)

Curing of concrete is defined as providing adequate moisture, temperature, and time to allow the concrete to achieve the desired properties for its intended use.

19. What are the types of finishing?

- Formwork finishes
- Surface treatment
- Applied finishes.

20. What are the necessary tests to find the quality of fresh concrete? (May/June 2014) (OR) What are the tests available for fresh concrete as per Indian Code of practice? (Nov 2014)

Tests on fresh concrete:

- Slump test for plastic workability
- Flow test for cohesiveness
- Vee- bee consistometer test
- Compaction factor test for stiff concrete
- Kelly Ball test

21. Mention any three destructive methods of testing concrete?(May 2013,2016)(or) What are the necessary tests to find the quality of hardened concrete?

Tests on hardened concrete:

- Compressive strength for compression test
- Tensile strength for tension test
- Flexure test modules of rupture

22. What is the importance of quality control of concrete?

Quality control means rational use of resources.

Quality control procedures implement:-

appropriate mixing, proper compaction, correct placement ,adequate curing.

23. Define non- destructive testing?

Nondestructive testing or Non-destructive testing (NDT) is a wide group of analysis techniques used in science and industry to evaluate the properties of a material, component or system without causing damage.

24. Name some methods of non-destructive testing of concrete? (Nov 2010, 2011, 2012, May 2012, 2013)

- Rebound hammer test
- Pulse velocity method
- Pull-out test
- Windsor probe test
- Break-off method
- Pull- off test

25. Differentiate rapid hardening cement and quick setting cement.(Nov 2010)

1. Rapid hardening cement is similar to OPC it develops the strength rapidly and as such it may be more appropriate to call it as high early strength cement, it is done by increasing the lime content.

2. Quick setting cement sets very early, the early setting property is brought out by reducing the gypsum content at the time of clinker grinder it is required, to be mixed placed and compacted very early.

26. List the various methods in concrete mix design? (May/June 2012)

- ACI methods
- IS code method
- BSI method

27. What are the types of cements? (Nov 2011)

- * Ordinary Portland cement
- * High alumina cement
- * Portland pozzolana cement
- * Quick – setting cement
- * Low – heat cement
- * Expanding cement
- * Rapid – hardening cement
- * Acid – resistant cement
- * Sulphate – resistant
- * White cement
- * Colored cement

28. Define Shrinkage?(May 2015)

Shrinkage is defined as the volume changes in concrete due to loss of moisture at different stages due to different reasons, which in turn affects the long-term strength and durability.

29. Define Controlled concrete?(Nov 2011)

Preliminary tests are conducted, the mix being designed by anyone of the mix design methods, to get the desired strength and durability. The concrete formed by this method is called controlled concrete.

30. What is the use of accelerators in concrete?(May 2016)

Accelerators are another very useful type of admixture which are added to get the early strength. Such situations may occur under the following conditions:

1. When early removal of formwork is needed.
2. When reduction of period of curing is needed.

31. What is meant by RMC? (Nov 2015)

Ready-mix concrete (RMC) is the concrete which is made at a plant away from the construction site and conveyed in special vehicles.