

## REVIEW QUESTIONS

- 6.1** Define workability of concrete; enlist the different methods for measuring it in the laboratory? Explain any one of them.
- 6.2** Describe the factors affecting the workability of fresh concrete. How does workability of fresh concrete differ from its rheology?
- 6.3** Explain the compacting factor test. Compare it with slump test
- 6.4** Describe segregation, bleeding and laitance of concrete. Explain the factors affecting them.
- 6.5** Explain different types of slump with sketch only.

## MULTIPLE-CHOICE QUESTIONS

- 6.1** Fresh concrete should
- be able to produce homogeneous concrete (mixable)
  - not segregate or bleed during transportation and placing (i.e., stable)
  - be cohesive and sufficiently mobile (i.e., flowable)
  - be amenable to thorough compaction and satisfactory surface finishing (i.e., compactable and finishable)
  - All of the above
- 6.2** Mixability of a concrete mix governs
- power requirement in the mixing plant
  - reproducibility of concrete batches
  - time of mixing
  - homogeneity of fresh concrete
  - All of the above
- 6.3** Workability of fresh concrete is most appropriately defined by
- the composite property satisfying the requirements of mixability, stability, transportability, placeability, mobility, compactability and finishability
  - ease and homogeneity with which it can be mixed, placed, compacted and finished
  - its consistency and plasticity
  - its slump and compaction factor values
  - All of the above
- 6.4** The empirical test used for assessing the workability of fresh concrete is
- the slump test
  - the compacting factor test
  - the Vee-Bee consistency test
  - the flow test
  - All of the above
- 6.5** The conventional empirical tests for assessing workability of concrete suffer from the drawback that
- they measure only a particular aspect of workability, i.e., these tests are single-point tests
  - they are operator sensitive
  - none of these tests is capable of dealing with the whole range of workabilities
  - they are not amenable to physical idealized modeling
  - All of the above
- 6.6** Identify the incorrect statement (s) with regard to the workability of fresh concrete.
- The change in workability due to a relative change in the water content in concrete is dependent on the mix ratio.
  - An increase in water content may result in a monotonous increase in workability.
  - High water content may result in segregation and bleeding.
  - Water content is limited to a value given by the water–cement ratio.
  - All of the above
- 6.7** Which of the following statement(s) is / are incorrect?
- The use of a larger size and/or rounded aggregate gives higher workability.

- (b) For the same water content, use of finer sand increases the workability.
- (c) The grading of fine aggregate is more critical than the grading of coarse aggregate for workability.
- (d) For high-strength concrete, a coarser grading is preferred.
- (e) fineness of cement has an influence on bleeding.
- 6.8** Identify the incorrect statement(s).
- (a) The segregation of coarse particles in a lean dry mix may be corrected by adding a small quantity of water to it.
- (b) The tendency to segregate can be minimized by reducing the height of drop of concrete.
- (c) The separation of cement paste from the concrete mix is termed segregation.
- (d) The aim is to have minimum possible workability consistent with satisfactory placement and compaction of concrete.
- (e) All of the above
- 6.9** Slump test is the most widely used field test primarily because
- (a) it indicates the behavior of fresh concrete under action of gravitational forces
- (b) of the simplicity of apparatus and test procedure
- (c) it measures consistency or wetness of the mix
- (d) it ensures uniformity among different batches of similar concrete
- (e) All of the above
- 6.10** The workability of concrete by slump test is expressed as
- (a)  $\text{mm}^3/\text{h}$
- (b)  $\text{mm}^2/\text{h}$
- (c)  $\text{mm}/\text{h}$
- (d)  $\text{mm}$
- (e) hours
- 6.11** A concrete having a slump of 70 mm is termed as
- (a) dry
- (b) semi-plastic
- (c) plastic
- (d) flowing
- (e) None of these
- 6.12** In case the concrete is to be transported by pumping, the slump should be
- (a) more than 100 mm
- (b) between 75 to 100 mm
- (c) between 25 and 50 mm
- (d) more than 25 mm
- (e) more than 10 mm
- 6.13** If the slump of concrete mix is 75 mm, its workability is considered to be
- (a) very high
- (b) high
- (c) medium
- (d) low
- (e) very low
- 6.14** The slump test of concrete is used to measure its
- (a) compaction under gravitational force
- (b) mobility
- (c) consistency
- (d) homogeneity
- (e) All of the above
- 6.15** For an RCC slab the slump of concrete should be
- (a) 0–25 mm
- (b) 25–50 mm
- (c) 25–100 mm
- (d) 50–125 mm
- (e) 100–150 mm
- 6.16** The slump of concrete to be transported by belt conveyors should be
- (a) 25–50 mm
- (b) 50–75 mm
- (c) 75–100 mm
- (d) 100–125 mm
- (e) 0–125 mm
- 6.17** Finishing of concrete surface will be difficult when the slump exceeds
- (a) 25 mm
- (b) 40 mm
- (c) 50 mm
- (d) 75 mm
- (e) 100 mm
- 6.18** Compacting factor test is superior to slump test mainly because it
- (a) gives behavior of fresh concrete under the action of external forces
- (b) measures compactibility of concrete
- (c) is more accurate than slump test for concrete mixes of medium and low workabilities

- (d) is more sensitive and gives more consistent results
  - (e) None of the above
- 6.19** The compacting factor test for fresh concrete
- (a) is adopted when nominal size of aggregate does not exceed 20 mm
  - (b) measures the relative effort required to change a mass of concrete from one definite shape to another
  - (c) measures the compaction obtained by a standard amount of work applied to a standard quantity of concrete
  - (d) gives an indication of the mobility of fresh concrete
  - (e) All of the above
- 6.20** A compacting factor of 0.88 for a fresh concrete sample indicates a mix of
- (a) high workability
  - (b) medium workability
  - (c) low workability
  - (d) very low workability
  - (e) None of the above
- 6.21** Concrete is considered unsuitable for compaction by vibration if
- (a) the compacting factor is more than 0.9
  - (b) it is of low workability
  - (c) it is very stiff
  - (d) slump is between 25–50 mm
  - (e) None of the above
- 6.22** Identify the correct statement(s).

Degree of work ability	Compacting factor	Slump
(a) high	0.68	125–150 mm
(b) medium	0.78	25–75 mm
(c) low	0.84	10–50 mm
(d) very low	0.90	—
(e) None of the above		

- 6.23** A concrete is said to be workable if

- (a) it is of uniform color
  - (b) it is almost a fluid
  - (c) it can be easily mixed, placed and compacted
  - (d) it has a tendency to segregate and bleed
  - (e) None of the above
- 6.24** The Vee-Bee test
- (a) is suitable for concrete mixes of low and very low workabilities
  - (b) is a remolding test
  - (c) is unsuitable for concretes having a slump of 75 mm or above
  - (d) is suitable since the concrete in the test receives a similar treatment as it would in actual practice
  - (e) Any of the above
- 6.25** Bleeding of concrete is said to occur when
- (a) finer particles settle down at the bottom
  - (b) coarser particles get separated
  - (c) cement paste rises to the surface of concrete
  - (d) finer particles collect in isolated pockets
  - (e) None of the above
- 6.26** Identify the incorrect statement(s) with regard to the bleeding of concrete.
- (a) Bleeding increases the permeability of concrete
  - (b) Bleeding causes laitance at the surface
  - (c) Bleeding can be corrected by the addition of a small amount of water
  - (d) Bleeding reduces the durability of concrete
  - (e) None of the above
- 6.27** Workability of concrete is independent of
- (a) mix proportions
  - (b) water content
  - (c) size, shape and texture of aggregate
  - (d) environment conditions
  - (e) None of the above
- 6.28** The separation of coarse aggregate from mortar during transportation of

- concrete is termed
- (a) bleeding
  - (b) creeping
  - (c) segregation
  - (d) flow of concrete
  - (e) cohesion
- 6.29** Segregation in concrete results in
- (a) porous layers
  - (b) honeycombing
  - (c) sand streaks
  - (d) surface scaling
  - (e) All of the above
- 6.30** The workability of concretes can be improved by the addition of any of the
- following except
- (a) fly ash
  - (b) copper sulfate
  - (c) calcium chloride
  - (d) plasticizers
  - (e) superplasticizers
- 6.31** A retarder plasticizer reduces workability loss
- (a) due to slowing down the process of setting
  - (b) due to air-entrainment
  - (c) hydrophobic action
  - (d) through the process of flocculation
  - (e) All of the above

**Answers to MCQs**

6.1 (e)	6.2 (e)	6.3 (a)	6.4 (e)	6.5 (e)	6.6 (a)
6.7 (b)	6.8 (c)	6.9 (b)	6.10 (d)	6.11 (c)	6.12 (b)
6.13 (c)	6.14 (c)	6.15 (d)	6.16 (b)	6.17 (c)	6.18 (d)
6.19 (c)	6.20 (b)	6.21 (a)	6.22 (c)	6.23 (c)	6.24 (e)
6.25 (c)	6.26 (c)	6.27 (a)	6.28 (c)	6.29 (e)	6.30 (b)
6.31 (a)					